



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)  
ARNOLD AIR FORCE BASE TENNESSEE

29 December 2000

MEMORANDUM FOR: All Prospective Offerors

FROM: AEDC/PKP  
100 Kindel Drive, Suite A-332  
Arnold AFB TN 37389-2312

SUBJECT: Solicitation F40650-00-R-0001, PWT Main Drive Starting Motors

1. Attached is the solicitation for the main drive starting motors for the Propulsion Wind Tunnel. The solicitation documents include:

The proposed contract (pages 1-12 of 41)  
Solicitation Instructions, including Representations and Certifications (pages 13-26 of 41)  
Evaluation Of Proposals (pages 27-31 of 41)  
Proposal Preparation Instructions (pages 32-41 of 41)  
Specification (Contract/Solicitation Attachment 1) 71 Pages  
Performance Information Format (Solicitation Attachment 2) 2 Pages

2. You should read all portions of the solicitation carefully. The specification defines our minimum technical requirements that must be met by the successful contractor. The proposal preparation instructions include direction regarding format and specific information that must be included in your proposal. The evaluation of proposals section defines the criteria and process which we will use to evaluate your proposal.

3. Please note that we have requested the performance information in advance of the remainder of the proposal. Receiving this information will allow us to begin verifying your performance on other relevant contracts before a complete proposal is due and hopefully will expedite the evaluation process.

4. Foreign nationals or representatives of foreign companies may not visit AEDC without prior approval. Please see AFMC FAR Supplement 5352.227-9002, VISIT REQUESTS BY FOREIGN OWNED OR CONTROLLED FIRMS in the solicitation.

5. If you have any questions, please call me at (931) 454-7844 or email me at [rick.stewart@arnold.af.mil](mailto:rick.stewart@arnold.af.mil).

W. RICHARD STEWART  
Contracting Officer

<b>SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS</b> <b>OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, &amp; 30</b>				1. REQUISITION NUMBER		PAGE 1 OF 41			
2. CONTRACT NO.		3. AWARD/EFFECTIVE DATE		4. ORDER NUMBER		5. SOLICITATION NUMBER F40650-00-R-0001			
7. FOR SOLICITATION INFORMATION CALL:		a. NAME RICK STEWART			b. TELEPHONE NUMBER (No collect calls) (931) 454-7844		6. SOLICITATION ISSUE DATE 29 DEC 2000		
9. ISSUED BY AEDC PKP CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>  AF PROCUREMENT BRANCH 100 KINDEL DRIVE, SUITE A-1332 ARNOLD AFB TN 37389-1332  RICK STEWART (931)454-7844  rick.stewart@arnold.af.mil				10. THIS ACQUISITION IS  <input checked="" type="checkbox"/> UNRESTRICTED <input type="checkbox"/> SET ASIDE: % FOR <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> SMALL DISADV. BUSINESS <input type="checkbox"/> 8(A)  SIC: 3621 SIZE STANDARD: 1000		11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED <input type="checkbox"/> SEE SCHEDULE			
						12. DISCOUNT TERMS			
				15. DELIVER TO CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>  USAF Warehouse #1 Receiving 1476 Avenue E Arnold AFB TN 37389-8000		16. ADMINISTERED BY CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>		13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)	
								13b. RATING DO-C9 14. METHOD OF SOLICITATION <input type="checkbox"/> RFQ <input type="checkbox"/> IFB <input checked="" type="checkbox"/> RFP	
17a. CONTRACTOR/ OFFEROR CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span> FACILITY CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>		18a. PAYMENT WILL BE MADE BY CODE <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>  DFAS-LI/FPD 3 Arkansas Road Limestone ME 04751-1500  EFT:T							
<input type="checkbox"/> 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER				18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a. UNLESS BLOCK BELOW IS CHECKED <input type="checkbox"/> SEE ADDENDUM					
19. ITEM NO.		20. SCHEDULE OF SUPPLIES/SERVICES		21. QUANTITY		22. UNIT			
25. ACCOUNTING AND APPROPRIATION DATA						26. TOTAL AWARD AMOUNT (For Govt. Use Only)			
<input checked="" type="checkbox"/> 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA <input checked="" type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED. <input type="checkbox"/> 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA <input type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED.									
28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.				29. AWARD OF CONTRACT: REFERENCE _____ OFFER DATED _____. YOUR OFFER SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:					
30a. SIGNATURE OF OFFEROR/CONTRACTOR				31a. UNITED STATES OF AMERICA (SIGNATURE OF CONTRACTING OFFICER)					
30b. NAME AND TITLE OF SIGNER		30c. DATE SIGNED		31b. NAME OF CONTRACTING OFFICER		31c. DATE SIGNED			
32a. QUANTITY IN COLUMN 21 HAS BEEN <input type="checkbox"/> RECEIVED <input type="checkbox"/> INSPECTED <input type="checkbox"/> ACCEPTED. AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED				33. SHIP NUMBER		34. VOUCHER NUMBER			
				PARTIAL <input type="checkbox"/> FINAL <input type="checkbox"/>		35. AMOUNT VERIFIED CORRECT FOR			
32b. SIGNATURE OF AUTHORIZED GOVT. REPRESENTATIVE		32c. DATE		36. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		37. CHECK NUMBER			
41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT		41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER		41c. DATE		42a. RECEIVED BY (Print)			
						42b. RECEIVED AT (Location)			
				42c. DATE REC'D (YY/MM/DD)		42d. TOTAL CONTAINERS			

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<u>Item</u>	<u>Supplies or Services</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
	Replacement Of The Propulsion Wind Tunnel Main Drive Starting System Consisting of the Following Items:				
0001	Base Item – (Defined by Offeror)	1	Lot		
0002	Option Item - (Defined by Offeror)	1	Lot		
0003	Option Item - (Defined by Offeror)	1	Lot		
	etc				

Offerors must clearly define their proposed breakout between the base item and options including a description of the work covered by each item and pricing. Three increments are the minimum acceptable for the primary proposal.

**1. 52.212-04 ADDENDUM TO CONTRACT TERMS AND CONDITIONS--COMMERCIAL ITEMS (May 1999)**

52.212-4, Contract Terms and Conditions -- Commercial Items is hereby tailored as follows:

- (a) The place of inspection, acceptance, and FOB is Arnold AFB TN .

**2. 52.212-04 ADDENDUM TO CONTRACT TERMS AND CONDITIONS--COMMERCIAL ITEMS (May 1999)**

(a) Inspection/Acceptance. The Contractor shall only tender for acceptance those items that conform to the requirements of this contract. The Government reserves the right to inspect or test any supplies or services that have been tendered for acceptance. The Government may require repair or replacement of nonconforming supplies or reperformance of nonconforming services at no increase in contract price. The Government must exercise its post-acceptance rights --

(1) Within a reasonable time after the defect was discovered or should have been discovered; and

(2) Before any substantial change occurs in the condition of the item, unless the change is due to the defect in the item.

(b) Assignment. The Contractor or its assignee's rights to be paid amounts due as a result of performance of this contract, may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency in accordance with the Assignment of Claims Act (31 U.S.C.3727).

(c) Changes. Changes in the terms and conditions of this contract may be made only by written agreement of the parties.

(d) Disputes. This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613). Failure of the parties to this contract to reach agreement on any request for equitable adjustment, claim, appeal or action arising under or relating to this contract shall be a dispute to be resolved in accordance with the clause at FAR 52.233-1, Disputes, which is incorporated herein by reference. The Contractor shall proceed diligently with performance of this contract, pending final resolution of any dispute arising under the contract.

(e) Definitions. The clause at FAR 52.202-1, Definitions, is incorporated herein by reference.

(f) Excusable delays. The Contractor shall be liable for default unless nonperformance is caused by an occurrence beyond the reasonable control of the Contractor and without its fault or negligence such as, acts of God or the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather, and delays of common carriers. The Contractor shall notify the Contracting Officer in writing as soon as it is reasonably possible after the commencement of any excusable delay, setting forth the full particulars in connection therewith, shall remedy such occurrence with all reasonable dispatch, and shall promptly give written notice to the Contracting Officer of the cessation of such occurrence.

(g) Invoice. The Contractor shall submit an original invoice and three copies (or electronic invoice, if authorized,) to the address designated in the contract to receive invoices. An invoice must include --

- (1) Name and address of the Contractor;
- (2) Invoice date;
- (3) Contract number, contract line item number and, if applicable, the order number;
- (4) Description, quantity, unit of measure, unit price and extended price of the items delivered;
- (5) Shipping number and date of shipment including the bill of lading number and weight of shipment if shipped on Government bill of lading;
- (6) Terms of any prompt payment discount offered;
- (7) Name and address of official to whom payment is to be sent; and
- (8) Name, title, and phone number of person to be notified in event of defective invoice.

Invoices will be handled in accordance with the Prompt Payment Act (31 U.S.C. 3903) and Office of Management and Budget (OMB) Circular A-125, Prompt Payment. Contractors are encouraged to assign an identification number to each invoice.

(h) Patent indemnity. The Contractor shall indemnify the Government and its officers, employees and agents against liability, including costs, for actual or alleged direct or contributory infringement of, or inducement to infringe, any United States or foreign patent, trademark or copyright, arising out of the performance of this contract, provided the Contractor is reasonably notified of such claims and proceedings.

(i) Payment. Payment shall be made for items accepted by the Government that have been delivered to the delivery destinations set forth in this contract. The Government will make payment in accordance with the Prompt Payment Act (31 U.S.C. 3903) and Office of Management and Budget (OMB) Circular A-125, Prompt Payment. If the Government makes payment by Electronic Funds Transfer (EFT), see 52.212-5(b) for the appropriate EFT clause. In connection with any discount offered for early payment, time shall be computed from the date of the invoice. For the purpose of computing the discount earned, payment shall be considered to have been made on the date which appears on the payment check or the specified payment date if an electronic funds transfer payment is made.

(j) Risk of loss. Unless the contract specifically provides otherwise, risk of loss or damage to the supplies provided under this contract shall remain with the Contractor until, and shall pass to the Government upon:

(1) Delivery of the supplies to a carrier, if transportation is f.o.b. origin; or

(2) Delivery of the supplies to the Government at the destination specified in the contract, if transportation is f.o.b. destination.

(k) Taxes. The contract price includes all applicable Federal, State, and local taxes and duties.

(l) Termination for the Government's convenience. The Government reserves the right to terminate this contract, or any part hereof, for its sole convenience. In the event of such termination, the Contractor shall immediately stop all work hereunder and shall immediately cause any and all of its suppliers and subcontractors to cease work. Subject to the terms of this contract, the Contractor shall be paid a percentage of the contract price reflecting the percentage of the work performed prior to the notice of termination, plus reasonable charges the Contractor can demonstrate to the satisfaction of the Government using its standard record keeping system, have resulted from the termination. The Contractor shall not be required to comply with the cost accounting standards or contract cost principles for this purpose. This paragraph does not give the Government any right to audit the Contractor's records. The Contractor shall not be paid for any work performed or costs incurred which reasonably could have been avoided.

(m) Termination for cause. The Government may terminate this contract, or any part hereof, for cause in the event of any default by the Contractor, or if the Contractor fails to comply with any contract terms and conditions, or fails to provide the Government, upon request, with adequate assurances of future performance. In the event of termination for cause, the Government shall not be liable to the Contractor for any amount for supplies or services not accepted, and the Contractor shall be liable to the Government for any and all rights and remedies provided by law. If it is determined that the Government improperly terminated this contract for default, such termination shall be deemed a termination for convenience.

(n) Title. Unless specified elsewhere in this contract, title to items furnished under this contract shall pass to the Government upon acceptance, regardless of when or where the Government takes physical possession.

(o) Warranty. The Contractor warrants and implies that the items delivered hereunder are merchantable and fit for use for the particular purpose described in this contract.

(p) Limitation of liability. Except as otherwise provided by an express or implied warranty, the Contractor will not be liable to the Government for consequential damages resulting from any defect or deficiencies in accepted items.

(q) Other compliances. The Contractor shall comply with all applicable Federal, State and local laws, executive orders, rules and regulations applicable to its performance under this contract.

(r) Compliance with laws unique to Government contracts. The Contractor agrees to comply with 31 U.S.C. 1352 relating to limitations on the use of appropriated funds to influence certain Federal contracts; 18 U.S.C. 431 relating to officials not to benefit; 40 U.S.C. 327, et seq., Contract Work Hours and Safety Standards Act; 41 U.S.C. 51-58, Anti-Kickback Act of 1986; 41 U.S.C. 265 and 10 U.S.C. 2409 relating to whistleblower protections; 49 U.S.C. 40118, Fly American; and 41 U.S.C. 423 relating to procurement integrity.

(s) Order of precedence. Any inconsistencies in this solicitation or contract shall be resolved by giving precedence in the following order:

(1) The schedule of supplies/services.

(2) The Assignments, Disputes, Payments, Invoice, Other Compliances, and Compliance with Laws Unique to Government Contracts paragraphs of this clause.

(3) The clause at 52.212-5.

(4) Addenda to this solicitation or contract, including any license agreements for computer software.

(5) Solicitation provisions if this is a solicitation.

(6) Other paragraphs of this clause.

(7) The Standard Form 1449.

(8) Other documents, exhibits, and attachments.

(9) The specification.

**3. 52.212-05 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS--COMMERCIAL ITEMS (Aug 2000)**

(a) The Contractor shall comply with the following FAR clauses, which are incorporated in this contract by reference, to implement provisions of law or executive orders applicable to acquisitions of commercial items:

(1) 52.222-3, Convict Labor (E.O. 11755);

(2) 52.233-3, Protest after Award (31 U.S.C 3553).

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) which the contracting officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

☒ (1) 52.203-6, Restrictions on Subcontractor Sales to the Government (Jul 1995), with Alternate I (Oct 1995) (41 U.S.C. 253g and 10 U.S.C. 2402).

☒ (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999). (If the offeror elects to waive the preference, it shall so indicate in its offer.)

☒ (6) 52.219-9, Small Business Subcontracting Plan (Oct 1999) (15 U.S.C. 637 (d)(4)).

☒ (11) 52.222-21, Prohibition of Segregated Facilities (Feb 1999).

☒ (12) 52.222-26, Equal Opportunity (FEB 1999)(E.O. 11246).

☒ (13) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (Apr 1998) (38 U.S.C. 4212).

☒ (14) 52.222-36, Affirmative Action for Workers with Disabilities (Jun 1998) (29 U.S.C. 793).



☒ (15) 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era (Jan 1999) (38 U.S.C. 4212).

☒ (22) 52.232-33, Payment by Electronic Funds Transfer-Central Contractor Registration (May 1999) (31 U.S.C. 3332).

☒ (27)(i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (Jun 2000) (46 U.S.C.1241).

\_\_\_\_(ii) Alternate I of 52.247-64.

☒ (c) The Contractor shall comply with the FAR clauses in this paragraph (c), applicable to commercial services, which the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

☒ (d) Comptroller General Examination of Record. The Contractor agrees to comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to include any FAR clause, other than those listed below (and as may be required by an addenda to this paragraph to establish the reasonableness of prices under Part 15), in a subcontract for commercial items or commercial components --

(1) 52.222-26, Equal Opportunity (E.O.11246);

(2) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C.4212);

(3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C.793); and

(4) 52.247-64, Preference for Privately-Owned U.S.- Flagged Commercial Vessels (46 U.S.C.1241) (flowdown not required for subcontracts awarded beginning May 1, 1996).

(5) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, et. seq.).

#### **4. 252.212-7001 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS APPLICABLE TO DEFENSE ACQUISITIONS OF COMMERCIAL ITEMS (Mar 2000)**

(a) The Contractor agrees to comply with any clause that is checked on the following list of DFARS clauses which, if checked, is included in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components.

☒ 252.205-7000 Provision of Information to Cooperative Agreement Holders (Dec 1991) (10 U.S.C. 2416).

☒ 252.219-7003 Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts) (Apr 1996) (15 U.S.C. 637).

☒ 252.225-7007 Buy American Act--Trade Agreements--Balance of Payments Program (Mar 1998) (41 U.S.C. 10a-10d, 19 U.S.C. 2501-2518, and 19 U.S.C. 3301 note).

☒ 252.225-7012 Preference for Certain Domestic Commodities (May 1999).

☒ 252.243-7002 Requests for Equitable Adjustment (Mar 1998) (10 U.S.C. 2410).

☒ 252.247-7023 Transportation of Supplies by Sea (Mar 2000) (10 U.S.C. 2631).

☒ (a) In addition to the clauses listed in paragraph (e) of the Contract Terms and Conditions Required to Implement Statutes or Executive Orders--Commercial Items clause of this contract (Federal Acquisition Regulation 52.212-5), the Contractor shall include the terms of the following clauses, if applicable, in subcontracts for commercial items or commercial components, awarded at any tier under this contract:

252.225-7014 Preference for Domestic Specialty Metals, Alternate I (10 U.S.C. 2241 note).

252.247-7023 Transportation of Supplies by Sea (10 U.S.C. 2631).

252.247-7024 Notification of Transportation of Supplies by Sea (10 U.S.C. 2631).

**5. 52.217-7 Option for Increased Quantity -- Separately Priced Line Item (Mar 1989)**

The Government may require the delivery of the numbered line item, identified in the Schedule as an option item, in the quantity and at the price stated in the Schedule. The Contracting Officer may exercise the option by written notice to the Contractor within three years after the date of contract award. Delivery of added items shall continue at the same rate that like items are called for under the contract, unless the parties otherwise agree.

**6. 52.228-5 -- Insurance -- Work on a Government Installation. (Jan 1997)**

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective --

(1) For such period as the laws of the State in which this contract is to be performed prescribe; or

(2) Until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

**7. 5352.228-9001 Insurance Clause Implementation (AFMC) (JUL 1997)**

The Contractor shall obtain and maintain the minimum kinds and amounts of insurance during performance of this contract as specified by FAR 28.307-2, Liability, and contemplated by FAR 52.228-5, Insurance--Work on a Government Installation, and/or 52.228-7, Insurance--Liability to Third Persons

**8. 5352.225-9001 English Language Requirements. (AFMC) (JUL 1997)**

- (a) Deliver all documents in the English language.
- (b) Provide an English language speaking person during in-plant visits, inspections, reviews, audits, and other similar activities.

**9. 5352.227-9002 VISIT REQUESTS BY FOREIGN OWNED OR CONTROLLED FIRMS (AFMC) (JUL 1997)**

- (a) Prime Contractors which are foreign-owned or controlled and require access to a U.S. Government installation shall submit visit requests through their foreign embassy in Washington, D.C. at least 30 days prior to the proposed visit date.
- (b) Subcontractors which are foreign-owned or controlled and require access to a U.S. Government installation shall have their prime Contractor submit a visit request to the security police office of the base being visited at least two weeks before the scheduled meeting.
- (c) Canadian Contractors and Canadian government employees may directly arrange visits by having their security office submit a visit request to the security policy office of the base being visited at least two weeks before the scheduled meeting.

DOCUMENT	PGS	DATE	TITLE
ATTACHMENT 1	71	20 Nov 2000	PERFORMANCE SPECIFICATION FOR REPLACEMENT OF THE PROPULSION WIND TUNNEL MAIN DRIVE STARTING SYSTEM
ATTACHMENT 2	2		Performance Information

**A. FEDERAL ACQUISITION REGULATION SOLICITATION PROVISIONS IN FULL TEXT**

**52.212-01 INSTRUCTIONS TO OFFERORS--COMMERCIAL ITEMS (OCT 2000)**

(a) *North American Industry Classification System (NAICS) code and small business size standard.* The NAICS code and small business size standard for this acquisition appear in Block 10 of the solicitation cover sheet (SF 1449). However, the small business size standard for a concern which submits an offer in its own name, but which proposes to furnish an item which it did not itself manufacture, is 500 employees.

(b) *Submission of offers.* Submit signed and dated offers to the office specified in this solicitation at or before the exact time specified in this solicitation. Offers may be submitted on the SF 1449, letterhead stationery, or as otherwise specified in the solicitation. As a minimum, offers must show --

- (1) The solicitation number;
- (2) The time specified in the solicitation for receipt of offers;
- (3) The name, address, and telephone number of the offeror;
- (4) A technical description of the items being offered in sufficient detail to evaluate compliance with the requirements in the solicitation. This may include product literature, or other documents, if necessary;
- (5) Terms of any express warranty;
- (6) Price and any discount terms;
- (7) "Remit to" address, if different than mailing address;
- (8) A completed copy of the representations and certifications at FAR 52.212-3;
- (9) Acknowledgment of Solicitation Amendments;
- (10) Past performance information, when included as an evaluation factor, to include recent and relevant contracts for the same or similar items and other references (including contract numbers, points of contact with telephone numbers and other relevant information); and
- (11) If the offer is not submitted on the SF 1449, include a statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation. Offers that fail to furnish required representations or information, or reject the terms and conditions of the solicitation may be excluded from consideration.

(c) *Period for acceptance of offers.* The offeror agrees to hold the prices in its offer firm for 30 calendar days from the date specified for receipt of offers, unless another time period is specified in an addendum to the solicitation.

(d) *Product samples.* When required by the solicitation, product samples shall be submitted at or prior to the time specified for receipt of offers. Unless otherwise specified in this solicitation, these samples shall be submitted at no expense to the Government, and returned at the sender's request and expense, unless they are destroyed during preaward testing.

(e) *Multiple offers.* Offerors are encouraged to submit multiple offers presenting alternative terms and conditions or commercial items for satisfying the requirements of this solicitation. Each offer submitted will be evaluated separately.

(f) *Late submissions, modifications, revisions, and withdrawals of offers.*

- (1) Offerors are responsible for submitting offers, and any modifications, revisions, or withdrawals, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time

for receipt is 4:30 p.m., local time, for the designated Government office on the date that offers or revisions are due.

(2)

(i) Any offer, modification, revision, or withdrawal of an offer received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

(A) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of offers; or

(B) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(C) If this solicitation is a request for proposals, it was the only proposal received.

(ii) However, a late modification of an otherwise successful offer, that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(3) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(4) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of offers by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(5) Offers may be withdrawn by written notice received at any time before the exact time set for receipt of offers. Oral offers in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile received at any time before the exact time set for receipt of offers, subject to the conditions specified in the solicitation concerning facsimile offers. An offer may be withdrawn in person by an offeror or its authorized representative if, before the exact time set for receipt of offers, the identity of the person requesting withdrawal is established and the person signs a receipt for the offer.

(g) *Contract award (not applicable to Invitation for Bids)*. The Government intends to evaluate offers and award a contract without discussions with offerors. Therefore, the offeror's initial offer should contain the offeror's best terms from a price and technical standpoint. However, the Government reserves the right to conduct discussions if later determined by the Contracting Officer to be necessary. The Government may reject any or all offers if such action is in the public interest; accept other than the lowest offer; and waive informalities and minor irregularities in offers received.

(h) *Multiple awards.* The Government may accept any item or group of items of an offer, unless the offeror qualifies the offer by specific limitations. Unless otherwise provided in the Schedule, offers may not be submitted for quantities less than those specified. The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit prices offered, unless the offeror specifies otherwise in the offer.

(i) *Availability of requirements documents cited in the solicitation.*

(1)

(i) The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29, and copies of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained for a fee by submitting a request to--

GSA Federal Supply Service Specifications Section  
Suite 8100  
470 L'Enfant Plaza, SW  
Washington, DC 20407  
Telephone (202) 619-8925)  
Facsimile (202 619-8978).

(ii) If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (i)(1)(i) of this provision. Additional copies will be issued for a fee.

(2) The DoD Index of Specifications and Standards (DoDISS) and documents listed in it may be obtained from the--

Department of Defense Single Stock Point (DoDSSP)  
Building 4, Section D  
700 Robbins Avenue  
Philadelphia, PA 19111-5094

Telephone (215) 697-2667/2179  
Facsimile (215) 697-1462.

(i) Automatic distribution may be obtained on a subscription basis.

(ii) Order forms, pricing information, and customer support information may be obtained-

(A) By telephone at (215) 697\_2667/2179; or

(B) Through the DoDSSP Internet site at <http://assist.daps.mil>.

(3) Nongovernment (voluntary) standards must be obtained from the organization responsible for their preparation, publication or maintenance.

(j) *Data Universal Numbering System (DUNS) Number.* (Applies to offers exceeding \$25,000.) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address. If the offeror does not have a DUNS number, it should contact Dun and Bradstreet to obtain one at no charge. An offeror within the United States may call 1-800-333-0505. The offeror may obtain more information regarding the DUNS number, including locations of local Dun and Bradstreet Information Services offices for offerors located outside the United States, from the Internet home page at



[http://www.customerservice@dnb.com](mailto:www.customerservice@dnb.com). If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at [globalinfo@mail.dnb.com](mailto:globalinfo@mail.dnb.com).

**52.212-03 OFFEROR REPRESENTATIONS AND CERTIFICATIONS--COMMERCIAL ITEMS (OCT 2000) - ALTERNATE I (OCT 2000)**

(a) *Definitions.* As used in this provision:

*"Emerging small business"* means a small business concern whose size is no greater than 50 percent of the numerical size standard for the NAICS code designated.

*"Service-disabled veteran-owned small business concern"*

(1) Means a small business concern-

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

*"Small business concern"* means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and size standards in this solicitation.

*"Veteran-owned small business concern"* means a small business concern-

(1) Not less than 51 percent of which is owned by one or more veterans(as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

*"Women-owned small business concern"* means a small business concern --

(1) Which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

*"Women-owned business concern"* means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) *Taxpayer identification number (TIN)* (26 U.S.C. 6109, 31 U.S.C. 7701). (Not applicable if the offeror is required to provide this information to a central contractor registration database to be eligible for award.)

(1) All offerors must submit the information required in paragraphs (b)(3) through (b)(5) of this provision to comply with debt collection requirements of 31 U.S.C.

7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the Internal Revenue Service (IRS).

(2) The TIN may be used by the government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.]

(3) *Taxpayer Identification Number (TIN).*

☐ TIN:\_\_\_\_\_.

☐ TIN has been applied for.

☐ TIN is not required because:

☐ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of the Federal Government;

(4) *Type of organization.*

☐ Sole proprietorship;

☐ Partnership;

☐ Corporate entity (not tax-exempt);

☐ Corporate entity (tax-exempt);

☐ Government entity (Federal, State, or local);

☐ Foreign government;

☐ International organization per 26 CFR 1.6049-4;

☐ Other \_\_\_\_\_.

(5) *Common parent.*

☐ Offeror is not owned or controlled by a common parent:

☐ Name and TIN of common parent:

Name \_\_\_\_\_

TIN \_\_\_\_\_

(c) Offerors must complete the following representations when the resulting contract is to be performed inside the United States, its territories or possessions, Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. Check all that apply.

(1) *Small business concern.* The offeror represents as part of its offer that it ☐ is, ☐ is not a small business concern.

(2) *Veteran-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that it ☐ is, ☐ is not a veteran-owned small business concern.

(3) *Service-disabled veteran-owned small business concern.* [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (c)(2) of this provision.] The offeror represents as part of its offer that it ☐ is, ☐ is not a service-disabled veteran-owned small business concern.

(4) *Small disadvantaged business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents, for general statistical purposes, that it ( ) is, ( ) is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(5) *Women-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it ( ) is, ( ) is not a women-owned small business concern.

**Note: Complete paragraphs (c)(6) and (c)(7) only if this solicitation is expected to exceed the simplified acquisition threshold.**

(6) *Women-owned business concern (other than small business concern).*

[Complete only if the offeror is a women-owned business concern and did not represent itself as a small business concern in paragraph (c)(1) of this provision.]. The offeror represents that it ( ) is, a women-owned business concern.

(7) *Tie bid priority for labor surplus area concerns.* If this is an invitation for bid, small business offerors may identify the labor surplus areas in which costs to be incurred on account of manufacturing or production (by offeror or first-tier subcontractors) amount to more than 50 percent of the contract price:

(8) Small Business Size for the Small Business Competitiveness Demonstration Program and for the Targeted Industry Categories under the Small Business Competitiveness Demonstration Program. [Complete only if the offeror has represented itself to be a small business concern under the size standards for this solicitation.]

(i) (Complete only for solicitations indicated in an addendum as being set-aside for emerging small businesses in one of the four designated industry groups (DIGs).) The offeror represents as part of its offer that it ( ) is, ( ) is not an emerging small business.

(ii) (Complete only for solicitations indicated in an addendum as being for one of the targeted industry categories (TICs) or four designated industry groups (DIGs).) Offeror represents as follows:

(A) Offeror's number of employees for the past 12 months (check the Employees column if size standard stated in the solicitation is expressed in terms of number of employees); or

(B) Offeror's average annual gross revenue for the last 3 fiscal years (check the Average Annual Gross Number of Revenues column if size standard stated in the solicitation is expressed in terms of annual receipts).

(Check one of the following):

<u>Number of Employees</u>	<u>Average Annual Gross Revenues</u>
50 or fewer	\$1 million or less
51-100	\$1,000,001-\$2 million
101-250	\$2,000,001-\$3.5 million
251-500	\$3,500,001-\$5 million
501-750	\$5,000,001-\$10 million
751-1,000	\$10,000,001-\$17 million
Over 1,000	Over \$17 million

(9) [Complete only if the solicitation contains the clause at FAR 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns, or FAR 52.219-25, Small Disadvantaged Business Participation Program-Disadvantaged Status and Reporting, and the offeror desires a benefit based on its disadvantaged status.]

(i) General. The offeror represents that either-

(A) It ( ) is, ( ) is not certified by the Small Business Administration as a small disadvantaged business concern and identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net), and that no material change in disadvantaged ownership and control has occurred since its certification, and, where the concern is owned by one or more individuals claiming disadvantaged status, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); or

(B) It ( ) has, ( ) has not submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(ii) Joint Ventures under the Price Evaluation Adjustment for Small Disadvantaged Business Concerns. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements in 13 CFR 124.1002(f) and that the representation in paragraph (c)(7)(i) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: \_\_\_\_\_.]

(10) (Complete if the offeror has represented itself as disadvantaged in paragraph (c)(2) or (c)(9) of this provision.) [The offeror shall check the category in which its ownership falls]:

\_\_\_ Black American.

\_\_\_ Hispanic American.

\_\_\_ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

\_\_\_ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory or the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

\_\_\_ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

\_\_\_ Individual/concern, other than one of the preceding.

(d) Representations required to implement provisions of Executive Order 11246 --

(1) Previous contracts and compliance. The offeror represents that --

- (i) It ( ) has, ( ) has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation; and  
(ii) It ( ) has, ( ) has not, filed all required compliance reports.

(2) *Affirmative Action Compliance.* The offeror represents that --

- (i) It ( ) has developed and has on file, ( ) has not developed and does not have on file, at each establishment, affirmative action programs required by rules and regulations of the Secretary of Labor (41 CFR parts 60-1 and 60-2), or  
(ii) It ( ) has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(e) *Certification Regarding Payments to Influence Federal Transactions* (31 U.S.C. 1352). (Applies only if the contract is expected to exceed \$100,000.) By submission of its offer, the offeror certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with the award of any resultant contract.

(f) *Buy American Act - Balance of Payments Program Certificate.* (Applies only if the clause at Federal Acquisition Regulation (FAR) 52.225-1, Buy American Act - Balance of Payments Program--Supplies, is included in this solicitation.)

(1) The offeror certifies that each end product, except those listed in paragraph (f)(2) of this provision, is a domestic end product (as defined in the clause of this solicitation entitled "Buy American Act - Balance of Payments Program--Supplies") and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. The offeror shall list as foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

(2) Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(3) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(g)

(1) *Buy American Act -- North American Free Trade Agreement -- Israeli Trade Act -- Balance of Payments Program Certificate.* (Applies only if the clause at FAR 52.225-3, Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(1)(ii) or (g)(1)(iii) of this provision, is a domestic end product as defined in the clause of this solicitation entitled "Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program" and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States.

(ii) The offeror certifies that the following supplies are NAFTA country end products or Israeli end products as defined in the clause of this solicitation

entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

NAFTA Country or Israeli End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(iii) The offeror shall list those supplies that are foreign end products (other than those listed in paragraph (g)(1)(ii) or this provision) as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program." The offeror shall list as other foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

Other Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(iv) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(2) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate I (Feb 2000)*. If Alternate I to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)

(ii) The offeror certifies that the following supplies are Canadian end products as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

Canadian End Products

Line Item No.: \_\_\_\_\_

[List as necessary]

(3) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate II (Feb 2000)*. If Alternate II to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act--Balance of Payments Program":

Canadian or Israeli End Products

Line Item No.:	Country of Origin:


[List as necessary]

(4) *Trade Agreements Certificate*. (Applies only if the clause at FAR 52.225-5, Trade Agreements, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(4)(ii) of this provision, is a U.S.-made, designated country, Caribbean Basin country, or NAFTA country end product, as defined in the clause of this solicitation entitled "Trade Agreements."

(ii) The offeror shall list as other end products those end products that are not U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products.

Other End Products

Line Item No.:	Country of Origin:

[List as necessary]

(iii) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25. For line items subject to the Trade Agreements Act, the Government will evaluate offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products without regard to the restrictions of the Buy American Act or the Balance of Payments Program. The Government will consider for award only offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products unless the Contracting Officer determines that there are no offers for such products or that the offers for such products are insufficient to fulfill the requirements of the solicitation.

(h) *Certification Regarding Debarment, Suspension or Ineligibility for Award (Executive Order 12549)*. The offeror certifies, to the best of its knowledge and belief, that --

(1) The offeror and/or any of its principals ( ) are, ( ) are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency, and

(2) ( ) Have, ( ) have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and ( ) are, ( ) are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses.

**B. DEFENSE FAR SUPP SOLICITATION PROVISIONS IN FULL TEXT**

**252.212-7000 OFFEROR REPRESENTATIONS AND CERTIFICATIONS--COMMERCIAL ITEMS  
(NOV 1995)**

(a) Definitions. As used in this clause--

(1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec. 2415).

(2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification. By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it--

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec. 2407(a) prohibits a United States person from taking.

(c) Representation of Extent of Transportation by Sea. (This representation does not apply to solicitations for the direct purchase of ocean transportation services).

(1) The Offeror shall indicate by checking the appropriate blank in paragraph (c)(2) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(2) Representation. The Offeror represents that it--

\_\_\_\_ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

\_\_\_\_ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(3) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense Federal



Acquisition Regulation Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

**252.225-7006 BUY AMERICAN ACT - TRADE AGREEMENTS - BALANCE OF PAYMENTS PROGRAM CERTIFICATE (MAR 1998)**

(a) Definitions. Caribbean Basin country end product, designated country end product, domestic end product NAFTA country end product, nondesignated country end product, qualifying country end product, and U.S. made end product have the meanings given in the Buy American Act--Trade Agreements--Balance of Payments Program clause of this solicitation.

(b) Evaluation.

Offers will be evaluated in accordance with the policies and of Part 225 of the Defense Federal Acquisition Regulation Supplement. Offers of foreign end products that are not U.S. made, qualifying country, designated country, Caribbean Basin country, or NAFTA country end products will not be considered for award, unless the Contracting Officer determines that there are no offers of such end products; or the offers of such end products are insufficient to fulfill the requirements; or a national interest exception to the Trade Agreements Act is granted.

(c) Certifications.

(1) The Offeror certifies that--

(i) Each end product, except the end products listed in paragraph (c)(2) of this provision, is a domestic end product; and

(ii) Components of unknown origin are considered to have been mined, produced, or manufactured outside the United States or a qualifying country.

(2) The Offeror must identify all end products that are not domestic end products.

(i) The Offeror certifies that the following supplies qualify as "U.S. made end products" but do not meet the definition of "domestic end product":

-----  
(insert line item number)

(ii) The Offeror certifies that the following supplies are qualifying country end products:

-----  
(insert line item number) (insert country of origin)

(iii) The Offeror certifies that the following supplies qualify as designated country end products:

-----  
(insert line item number) (insert country of origin)

(iv) The Offeror certifies that the following supplies qualify as Caribbean Basin country end products:

-----  
(insert line item number) (insert country of origin)

(v) The Offeror certifies that the following supplies qualify as NAFTA country end products:

-----  
(insert line item number) (insert country of origin)

(vi) The following supplies are other nondesignated country end products.

-----  
Insert line item number      Insert country of origin  
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#### **5352.215-9007 USE OF NON-GOVERNMENT ADVISORS (AFMC) (NOV 1998)**

(a) Offerors are advised that technical and cost/price data submitted to the Government in response to this solicitation may be released to non- Government advisors for review and analysis. The non-Government advisor support will be provided by:

**Name(s) of firm(s): Sverdrup Technology, Inc.**

(b) Offerors shall complete paragraph (b)(2) or provide written objection to disclosure as indicated in paragraph (b)(1). If the offeror objects to disclosure of a portion of the proposal, the consent in (b)(2) should be provided for the remainder of the proposal.

(1) Any objection to disclosure:

(i) Shall be provided in writing to the contracting officer within 10 days of RFP issuance; and

(ii) Shall include a detailed statement of the basis for the objection. The detailed statement shall identify the specific portions of the proposal the offeror objects to disclosure to non-Government advisors.

(2) I understand technical and cost/price data submitted to the Government in response to this solicitation may be released to non-Government advisors. I consent to release of any (unless objection is provided in (b)(1) above) proprietary, confidential, or privileged commercial or financial data provided by the firm(s) named below in response to this solicitation, to non-Government advisors for review and analysis:

Firm:

Name (individual authorized to commit firm):

Title:

Date of Execution:

#### 5352.215-9016 ACQUISITION OMBUDSMAN (AFMC) (JUL 1997)

An Ombudsman has been appointed to hear concerns from offerors or potential offerors during the proposal development phase of this acquisition. The Ombudsman does not diminish the authority of the program director or Contracting Officer, but communicates Contractor concerns, issues, disagreements, and recommendations to the appropriate Government personnel. When requested, the Ombudsman shall maintain strict confidentiality as to the source of the concern. The Ombudsman does not participate in the evaluation of proposals or in the source selection process. Interested parties are invited to call Mr Alan Goldstain at (931) 454-6001

## **EVALUATION OF PROPOSALS**

### **1. SOURCE SELECTION**

#### **1.1. Basis for Contract Award**

The Government will select the best overall offer, based upon an integrated assessment of Mission Capability, Past Performance, Proposal Risk, and Price/Cost. This is a best value source selection conducted in accordance with Air Force Federal Acquisition Regulation Supplement (AFFARS) 5315.3 Source Selection and the AFMC supplement (AFMCFARS) thereto. A contract may be awarded to the offeror who is deemed responsible in accordance with the Federal Acquisition Regulation (FAR), as supplemented, whose proposal conforms to the solicitation's requirements (to include all stated terms, conditions, representations, certifications, and all other information required by Section L of this solicitation) and is judged, based on the evaluation factors and subfactors to represent the best value to the Government. The Government seeks to award to the offeror who gives the Air Force the greatest confidence that it will best meet or exceed the requirements affordably. This may result in an award to a higher rated, higher priced offeror, where the decision is consistent with the evaluation factors and the Source Selection Authority (SSA) reasonably determines that the technical superiority and/or overall business approach and/or superior past performance of the higher price offeror outweighs the cost difference. To arrive at a source selection decision, the SSA will integrate the source selection team's evaluations of the evaluation factors and subfactors (described below). While the Government source selection evaluation team and the SSA will strive for maximum objectivity, the source selection process, by its nature, is subjective and, therefore, professional judgment is implicit throughout the entire process.

#### **1.2. Number of Contracts to be Awarded**

The Government intends to award one contract as a result of this solicitation.

#### **1.3. Rejection of Unrealistic Offers**

The Government may reject any proposal that is evaluated to be unrealistic in terms of program commitments, including contract terms and conditions, or unrealistically high or low in cost when compared to Government estimates, such that the proposal is deemed to reflect an inherent lack of competence or failure to comprehend the complexity and risks of the program.

#### **1.4. Correction Potential of Proposals**

The Government will consider, throughout the evaluation, the "correction potential" of any deficiency or proposal inadequacy. The judgement of such "correction potential" is within the sole discretion of the Government. If an aspect of an offeror's proposal not meeting the Government's requirements is not considered correctable, the offeror may be eliminated from the competitive range.

### 1.5. Discussions

If, during the evaluation period, it is determined to be in the best interest of the Government to hold discussions, offeror responses to Evaluation Notices (ENs), and the Final Proposal Revision (FPR) will be considered in making the source selection decision.

## **2 EVALUATION FACTORS**

### 2.1. Evaluation Factors and Subfactors and their Relative Order of Importance

Award will be made to the offeror proposing the combination most advantageous to the Government based upon an integrated assessment of the evaluation factors and subfactors described below. The evaluation factors are equally important. Within the Mission Capability factor, the subfactors are listed in descending order of importance.

#### Factor 1: Mission Capability

Subfactor 1: System Performance

Subfactor 2: Schedule/Downtime

Subfactor 3: Option Structure

Subfactor 4:: Participation of Small and Small Disadvantaged Businesses (SDB), Historically Black Colleges and Universities, and Minority Institutions

Factor 2: Past Performance

Factor 3: Proposal Risk

Factor 4: Price

### 2.2. Importance of Cost/Price

**In accordance with FAR 15.304(e), the evaluation factors other than price, when combined, are significantly more important than price; however, price will contribute substantially to the selection decision.**

### 2.3. Factor and Subfactor Rating

A color rating will be assigned to each subfactor under the Mission Capability factor. The color rating depicts how well the offeror's proposal meets the Mission Capability subfactor requirements in accordance with the stated explanation, within the subfactor, of how the subfactor will be evaluated. The Mission Capability subfactors are described in paragraph d. below. A proposal risk rating will be assigned to each of the Mission Capability subfactors. Proposal risk represents the risks identified with an offeror's proposed approach as it relates to the Mission Capability subfactor. A Performance Confidence Assessment will be assigned to the Past Performance factor. Performance confidence represents the Government's assessment of the probability of an offeror successfully performing as proposed and is derived from an evaluation of the offeror's present and past work record. Price/cost will be evaluated as described in paragraph d below. When the integrated assessment of all aspects of the evaluation is accomplished, the color ratings, proposal risk ratings, performance confidence

assessment, and evaluated cost/price will be considered in the order of priority listed in paragraph a above. Any of these considerations can influence the SSA's decision.

#### 2.4. Mission Capability Factor

Each subfactor within the Mission Capability Factor will receive one of the color ratings described in AFFARS 5315.305(a)(3)(i), based on the assessed strengths and proposal inadequacies of each offeror's proposal as they relate to each of the Mission Capability subfactors. Subfactor ratings shall not be rolled up into an overall color rating for the Mission Capability factor.

2.4.1. System Performance: This subfactor will be evaluated on the basis of ability of the proposed system to comply with the minimum requirements of the system specification. The proposed system and motor efficiency, system maintainability, and warranty considerations will be evaluated in this subfactor. Performance areas that would result in a more favorable evaluation include PWT Main Drive Starting Sstem availability better than 97.7%, the historical availability of the existing system.

2.4.2. Schedule/Downtime: This subfactor will be evaluated on both overall performance schedule as well as number of and duration of facility downtimes. Each proposal will be evaluated on completeness and realism of planning for meeting any proposed schedule or downtime requirement. The extent of preparatory on-site effort and pre-downtime quality assurance verification of items to be installed will be evaluated in this subfactor. The objective for facility downtimes is that no downtime exceeds three weeks duration and that there be no more than three downtimes required.

2.4.3. Option Structure: This subfactor will be evaluated on how well the proposal structures the contract line items, including options, to meet the funding profile constraints. Proposals which provide usable function subsystems or items will be considered more advantageous than proposals which provide only partial or no functionality until completion of all options.

2.4.4. Participation of Small and Small Disadvantaged Businesses (SDB),Historically Black Colleges and Universities, and Minority Institutions: All proposals will be evaluated as to the extent of participation of SDB firms. Offerors will provide targets for SDB participation, expressed as dollars and percentages of total contract value, in each of the applicable and authorized SIC Major Groups as well as a total target for SDB participation as joint venture partners, team members, or subcontractors. The authorized Standard Industrial Classification (SIC) Major Groups are 10, 12 - 17, 22 - 31 34, 36 – 39, 41,42, 44, 46 - 65, 67, 70, 73, 75, 76, 80, 82, 87, and 89. These targets will be incorporated into and become a part of the contract. The successful offeror will be required to provide reports on SDB subcontractor participation in accordance with FAR clause 52.219-25 in Section I of the contract.

If the offeror is other than a small business, the offeror's Small Business Subcontracting Plan submitted in accordance with FAR 52.219-9 and Section L paragraph shall also

be evaluated to determine the extent to which the offeror identifies and commits to the participation of SB, HBCU, and MI whether as joint venture members, teaming arrangement, or subcontractor. Failure to submit such a plan will render the offeror ineligible for award.

## 2.5. Past Performance Factor

Under the Past Performance factor, the Performance Confidence Assessment represents the evaluation of an offeror's present and past work record to assess the Government's confidence in the offeror's probability of successfully performing as proposed. The Government will evaluate the offeror's demonstrated record of contract compliance in supplying products and services that meet user's needs, including cost and schedule. The Past Performance Evaluation is accomplished by reviewing aspects of an offeror's relevant present and recent past performance, focusing on and targeting performance which is relevant to the Mission Capability subfactors. In determining relevance, consideration will be given to turnkey, large motor system of similar complexity and turnkey installations within downtime constraints. This information may include data on efforts performed by other divisions, critical subcontractors, or teaming contractors, if such resources will be brought to bear or significantly influence the performance of the proposed effort. Past efforts which used the proposed subcontractors or teaming for design, fabrication and/or installation will be considered more relevant. The Government may consider as relevant efforts performed for agencies of the federal, state, or local governments and commercial customers.

Where relevant performance record indicates performance problems, the Government will consider the number and severity of the problems and the appropriateness and effectiveness of any corrective actions taken (not just planned or promised). The Government may review more recent contracts or performance evaluations to ensure corrective actions have been implemented and to evaluate their effectiveness.

Each offeror will receive one of the ratings described in AFFARS 5315.305(a)(2)(S-92) for the Past Performance factor.

Offerors without a record of relevant past performance or for whom information on past performance is not available will not be evaluated favorably or unfavorably on past performance and, as a result, will receive a "Neutral/Unknown Confidence" rating for the Past Performance factor. More recent and relevant performance will have a greater impact on the Performance Confidence Assessment than less recent or relevant effort. A strong record of relevant past performance may be considered more advantageous to the Government than a "Neutral/Unknown Confidence" rating. Likewise, a more relevant past performance record may receive a higher confidence rating and be considered more favorably than a less relevant record of favorable performance.

## 2.6. Proposal Risk Factor

Proposal Risk will be evaluated at the Mission Capability subfactor level. The Proposal Risk assessment focuses on the risks and weaknesses associated with an offeror's proposed approach and includes an assessment of the potential for disruption of schedule, increased cost, degradation of performance, and the need for increased Government oversight, as well as the likelihood of unsuccessful contract performance. For each identified risk, the assessment also addresses the offeror's proposal for mitigating the risk and why that approach is or is not manageable. Each Mission Capability subfactor will receive one of the Proposal Risk ratings defined at AFFARS 5315.305(a)(3)(ii).

## 2.7. Price Factor

The offeror's cost/price proposal will be evaluated for award purposes, based upon the total price proposed for basic requirements (basic award) and all options.

Evaluation of options shall not obligate the Government to exercise such options.

## **3. PRE-AWARD SURVEY**

The Government may conduct a pre-award survey (PAS) as part of this source selection. Results of the PAS (if conducted) will be evaluated to determine each offeror's capability to meet the requirements of the solicitation.

## **4. PLANT VISITS**

The Source Selection Evaluation Team (SSET) may conduct plant visits during the evaluation phase to gather information for judging the offeror's potential for correcting deficiencies, quality of development or manufacturing practices/processes, or other areas useful in evaluating the offer. If conducted, the results will be assessed under the applicable factors/subfactors and will be used to validate and confirm the offeror's written proposal and/or oral presentation.

## **5. SOLICITATION REQUIREMENTS, TERMS AND CONDITIONS**

Offerors are required to meet all solicitation requirements, such as terms and conditions, representations and certifications, and technical requirements, in addition to those identified as factors, and subfactors to be eligible for award. Failure to comply with the terms and conditions of the solicitation may result in the offeror being removed from consideration for award. Any exceptions to the solicitation's terms and conditions must be fully explained and justified.



## INSTRUCTIONS FOR PROPOSAL PREPARATION

### 1.0 Program Structure and Objectives

#### 1.1. Budget/Funding Information

For consideration in developing your proposal, funding for this project is expected in three roughly equal increments. These funding increments are expected in FY01, FY02 and FY03 but could be delayed for an additional year. Providing a contract line item structure which allows at least three separate increments is considered a critical proposal requirement. Non-conformance with a three year funding profile may result in an unfavorable proposal evaluation.

### 2.0 General Instructions

(a) This section provides general guidance for preparing proposals as well as specific instructions on the format and content of the proposal. The offeror's proposal must include all data and information requested and must be submitted in accordance with these instructions. The offer shall be compliant with the requirements as stated in the System Specification and Model Contract. **Non-conformance with these instructions may result in an unfavorable proposal evaluation.**

(b) The proposal shall be clear, concise, and shall include sufficient detail for effective evaluation and for substantiating the validity of stated claims. The proposal should not simply rephrase or restate the Government's requirements, but rather shall provide convincing rationale to address how the offeror intends to meet these requirements. Offerors shall assume that the Government has no prior knowledge of their facilities and experience, and will base its evaluation on the information presented in the offeror's proposal.

(c) Elaborate brochures or documentation, binding, detailed art work, or other embellishments are unnecessary and are not desired. Similarly, for oral presentations, elaborate productions are unnecessary and not desired.

(d) The proposal acceptance period is specified in the model contract/solicitation. The offeror shall make a clear statement in the proposal documentation volume that the proposal is valid until this date.

(e) In accordance with FAR Subpart 4.8 (Government Contract Files), the Government will retain one copy of all unsuccessful proposals. Unless the offeror requests otherwise, the Government will destroy extra copies of such unsuccessful proposals.

## 2.1 General Information

### 2.1.1. Point of Contact

The Contracting Officer (CO) is the sole point of contact for this acquisition. Address any questions or concerns you may have to the CO. Written requests for clarification may be sent to the CO at the address located in Section A of the model contract/ solicitation.

### 2.1.2. Debriefings

The CO will promptly notify offerors of any decision to exclude them from the competitive range, whereupon they may request and receive a debriefing in accordance with FAR 15.505. The CO will notify unsuccessful offerors in the competitive range of the source selection decision in accordance with FAR 15.506. Upon such notification, unsuccessful offerors may request and receive a debriefing. Offerors desiring debriefing must make their request in accordance with the requirements of FAR 15.505 or 15.506, as applicable.

### 2.1.3. Discrepancies

If an offeror believes that the requirements in these instructions contain an error, omission, or are otherwise unsound, the offeror shall immediately notify the CO in writing with supporting rationale. The offeror is reminded that the Government reserves the right to award this effort based on the initial proposal, as received, without discussion.

## 2.2 Organization/Number of Copies/Page Limits

The offeror shall prepare the proposal as set forth in the Proposal Organization Table (Table 2.2 below). The titles and contents of the volumes shall be as defined in this table, all of which shall be within the required page limits and with the number of copies as specified in Table 2.2. The attachments identified in the table should be separately bound in three-ring, loose-leaf binders, as necessary. The contents of each proposal volume are described in the ITO paragraph as noted in the table below:

**Table 2.2 - Proposal Organization**

VOLUME	Proposal Preparation Instructions Paragraph Number	VOLUME TITLE	PAGE LIMIT
I	3.0	Mission Capability	100
II	4.0	Contract Documentation	N/A
III	5.0	Relevant Past and Present Performance	2 Pages per Contract

Two hard copies and one electronic copy of each volume is required.

### 2.2.1 Page Limitations

Page limitations shall be treated as maximums. If exceeded, the excess pages will not be read or considered in the evaluation of the proposal and (for paper copies) will be returned to the offeror as soon as practicable. Page limitations shall be placed on responses to ENs. The specified page limits for EN responses will be identified in the letters forwarding the ENs to the offerors. When both sides of a sheet display printed material, it shall be counted as 2 pages. Each page shall be counted except the following:

*Cover pages, tables of contents, tabs, and glossaries*

### 2.2.2 Pricing Information

All pricing information shall be addressed in the Contract Documentation volume, in Section B of the Schedule of the RFP. Information shall be limited to Contract Line Item Number (CLIN), or SubCLIN, level pricing, including unit and extended pricing, as specified in the Schedule of Items of the RFP.

### 2.2.3 Indexing

Each volume shall contain a more detailed table of contents to delineate the subparagraphs within that volume. Tab indexing shall be used to identify sections.

### 2.2.4 Glossary of Abbreviations and Acronyms

Each volume shall contain a glossary of all abbreviations and acronyms used, with an explanation for each. Glossaries do not count against the page limitations for their respective volumes.

## 2.3. Page Size and Format

(a) Page size shall be 8.5 x 11 inches, not including foldouts. Pages shall be single spaced. Except for the reproduced sections of the solicitation document, the text size shall be no less than 10point. Use at least 1 inch margins on the top and bottom and 3/4 inch side margins. Pages shall be numbered sequentially by volume. These page format restrictions shall apply to responses to Evaluation Notices (ENs). These limitations shall apply to both electronic and hard copy proposals.

(b) Legible tables, charts, graphs and figures shall be used wherever practical to depict organizations, systems and layout, implementation schedules, plans, etc. These displays shall be uncomplicated, legible and shall not exceed 11 by 17 inches in size. Foldout pages shall fold entirely within the volume, and each 8.5 x 11 surface of a foldout shall be counted as a separate page. Foldout pages may only be used for large tables, charts, graphs, diagrams and schematics; not for pages of text. For tables, charts, graphs and figures, the text shall be no smaller than 10 point. These limitations shall apply to both electronic and hard copy proposals.

## 2.4 Binding and Labeling

Each volume of the proposal should be separately bound in a three-ring loose leaf binder which shall permit the volume to lie flat when open. Staples shall not be used. A cover sheet should be bound in each book, clearly marked as to volume number, title, copy number, solicitation identification and the offeror's name. The same identifying data should be placed on the spine of each binder. Be sure to apply all appropriate markings including those prescribed in accordance with FAR 52.215-1(e), Restriction on Disclosure and Use of Data, and 3.104-5, Disclosure, Protection, and Marking of Contractor Bid or Proposal Information and Source Selection Information.

## 2.5 Electronic Offers

For electronic copies, indicate on each diskette or CD ROM, the volume number and title. Use separate files to permit rapid location of all portions, including exhibits, annexes, and attachments, if any. The offeror shall submit volumes I and II in electronic format, using IBM-compatible, virus-free 3.5 inch high density diskettes with the "read only" notch open or CD ROM. Each volume shall be on a different diskette. If files are compressed, the necessary decompression program must be included. The electronic copies of the proposal shall be submitted in a format readable by Microsoft (MS) Word 97, MS Excel 97, MS-Project 97, and MS-Power Point 97, as applicable.

## 2.6 Distribution

The "original" proposal shall be identified. Proposals shall be addressed to the Contracting Officer and mailed to the address in Block 9 of the Standard Form 1449

## **3.0 Volume I - Mission Capability Volume**

### 3.1 General

The Mission Capability Volume should be specific and complete. Legibility, clarity and coherence are very important. Your responses will be evaluated against the Mission Capability subfactors defined in Section M, Evaluation Factors for Award. Using the instructions provided below, provide as specifically as possible the actual methodology you would use for accomplishing/satisfying these subfactors. All the requirements specified in the solicitation are mandatory. By your proposal submission, you are representing that your firm will perform all the requirements specified in the solicitation. It is not necessary or desirable for you to tell us so in your proposal. Do not merely reiterate the objectives or reformulate the requirements specified in the solicitation.

### 3.2 Format and Specific Content

#### 3.2.1 Narrative Summary

A concise narrative summary of the entire proposal, including significant risks, and a highlight of any key or unique features, excluding cost/price. The salient features should tie in with Section M evaluation factors/subfactors. Any summary

material presented here shall not be considered as meeting the requirements for any portions of other volumes of the proposal.

### 3.2.2 Mission Capability and Proposal Risk

Mission Capability and Proposal Risk will be addressed in the Mission Capability volume. In this volume, address your proposed approach to meeting the requirements of each Mission Capability subfactor, as well as the risks in your proposed approach in terms of mission capability/performance, cost, and/or schedule.

Address Proposal Risk by identifying those aspects of the proposal you consider to involve cost and/or mission capability subfactor risk and classify each in accordance with AFFARS 5315.305(a)(3)(iii). Provide the rationale for each risk and its rating, including quantitative estimates of the impact on cost, schedule, and performance. Describe the impact of each identified risk in terms of its potential to interfere with or prevent the successful accomplishment of other contract requirements (for example: SOW or specification requirements), whether or not those requirements are identified as subfactors or elements. Suggest a realistic "work-around" or risk mitigator for identified risks that will eliminate or reduce risk to an acceptable level. Identify and classify any new risks introduced by such risk mitigation.

3.2.2.1 System Performance: The proposal shall include an availability analysis that includes documented mean-time-between failure and mean-time-to-repair data for each system component. Provide a concise, complete analysis that logically combines the component properties to arrive at the overall system availability.

3.2.2.2 Schedule/Downtime: The proposal shall a detailed schedule, with milestones, for all field investigations, design, fabrication, manufacturing, logistics, personnel mobilization, installation, and checkout work necessary to complete the work under this specification. Submit the schedule information in a Gantt chart format. Include individual work elements for each activity. Include work elements that correspond to each line item in Table II, Performance Requirements Verification Matrix, of 356600, Performance Specification for Replacement of the Propulsion Wind Tunnel Main Drive Starting System.

Submit not less than a third-level work breakdown structure. Show start and end dates for each work element, as well as work sequence, time sequence, and other pertinent interrelationships between all work elements.

3.2.2.3 Option Structure: The proposal shall clearly describe what is being offered in the basic item and each option. The proposal shall include the rationale for the segmentation of the total system. It shall describe the functionality that will exist at the completion of the basic item and each option item and will assess the risks at each funding point if subsequent options are not exercised. It shall also include actions that would be necessary, in the absence of full funding for options, to mitigate those risks.

3.2.2.4 Participation of Small and Small Disadvantaged Businesses, Historically Black Colleges and Universities and Minority Institutions. Offerors must provide this information with the model contract discussed in paragraphs 4.3.3.1 and 4.3.3.2 below. All information submitted for this subfactor will not be included in the page limitation for the Mission Capability Volume

### 3.2.3 Volume Organization

The Mission Capability volume shall be organized according to the following general outline:

- (1) Table of Contents
- (2) List of Table and Drawings
- (3) Glossary
- (4) Cross Reference Matrix
- (5) Subfactor One – System Performance
- (6) Subfactor Two – Schedule/Downtime
- (7) Subfactor Three – Option Structure
- (8) Risk Matrix

## **4.0 Volume II - Contract Documentation**

### 4.1 Model Contract/Representations and Certifications

The purpose of this volume is to provide information to the Government for preparing the contract document and supporting file. The offeror's proposal shall include a signed copy of the Model Contract.

#### 4.1.1 - Solicitation/Contract Form

The offeror must complete blocks 12, 17, 23, and 24 and signature and date for blocks 30 a-c of the Standard Form 1449. Signature by the offeror on the SF 1449 constitutes an offer, which the Government may accept. The "original" copy should be clearly marked under separate cover and should be provided without any punched holes.

#### 4.1.2 Supplies or Services and Costs/Prices

Completed pricing information in schedule of items of the model contract. The offeror shall insert the proposed Contract Line Item structure with prices for the basic award and each option proposed. Any price adjustments based on timing of exercise of any option must be clearly stated.

#### 4.1.3 Deliveries or Performance

The offeror shall propose the delivery schedule by in the Deliveries or Performance section of the model contract. The proposal must clearly define

overall performance schedule for each CLIN as well as facility downtime required for each CLIN.

**4.1.4 Representations, Certifications, and other Statements of Offerors**  
The offeror shall complete all representations, certifications, acknowledgments and statements in the solicitation.

#### 4.2 Exceptions to Terms and Conditions

Exceptions taken to terms and conditions of the model contract, to any of its formal attachments, or to other parts of the solicitation shall be identified. Each exception shall be specifically related to each paragraph and/or specific part of the solicitation to which the exception is taken. Provide rationale in support of the exception and fully explain its impact, if any, on the performance, schedule, cost, and specific requirements of the solicitation. This information shall be provided in the format and content of Table 6.2. Failure to comply with the terms and conditions of the solicitation may result in the offeror being removed from consideration for award.

**Table 4.2 - Solicitation Exceptions**

<b><i>SOLICITATION Document</i></b>	<b><i>Paragraph/Page</i></b>	<b><i>Requirement/Portion</i></b>	<b><i>Rationale</i></b>
<i>SPEC Model Contract, Instructions for Proposal Preparation, etc.</i>	<i>Applicable Page and Paragraph Numbers</i>	<i>Identify the requirement or portion to which exception is taken</i>	<i>Justify why the requirement will not be met</i>

#### 4.3 Other Information Required

##### **4.3.1 Authorized Offeror Personnel**

Provide the name, title and telephone number of the company/division point of contact regarding decisions made with respect to your proposal and who can obligate your company contractually. Also, identify those individuals authorized to negotiate with the Government.

##### **4.3.2 Company/Division Address, Identifying Codes, and Applicable Designations**

Provide company/division's street address, county and facility code; CAGE code; DUNS code; size of business (large or small); and labor surplus area designation. This same information must be provided if the work for this contract will be performed at any other location(s). List all locations where work is to be performed and indicate whether such facility is a division, affiliate, or subcontractor, and the percentage of work to be performed at each location.

### 4.3.3 Attachments to the Model Contract

The offeror shall provide the following as attachments to the model contract:

#### 4.3.3.1 Subcontracting Plan

Include a Subcontracting Plan in accordance with FAR 19.702. The plan must be approved by the CO before contract award.

#### 4.3.3.2 Participation of Small Disadvantaged Businesses

Pursuant to the requirements of FAR provision 52.219-24, each offeror must provide, with its offer, targets, expressed as dollars and percentages of total contract value, for SDB participation in any of the SIC Major Groups as determined by the Department of Commerce. The authorized SIC Major Groups are 10, 12 - 17, 22 - 31 34, 36 - 42, 44, 46 - 65, 67, 70, 73, 75, 76, 80, 82, 87, and 89. These SIC Major Groups are also posted at <http://www.arnet.gov/Reference/sdbadjustments.htm>. The targets may provide for participation by a prime contractor, joint venture partner, teaming arrangement member, or subcontractor; however, the targets for subcontractors must be listed separately.

#### 4.3.3.3 Participation of Small Businesses (SB), Historically Black Colleges and Universities, or Minority Institutions (HBCU/MI)

If the offeror is other than a small business, the offeror shall submit a Small Business Subcontracting Plan in accordance with FAR 52.219-9 that also identifies and specifies the extent of offeror's commitment to the participation of small businesses (SB), historically black colleges or universities (HBCU) and minority institutions (MI), whether as joint venture members, teaming arrangement partners, or subcontractors. If applicable, submit a copy of your approved Master Plan. In the event the offeror has negotiated a comprehensive subcontracting plan pursuant to DFARS 219.702, the offeror must submit the information that identifies and specifies the extent of its commitment to the participation of SB, HBCU and MI.

## **5.0 Volume III - Relevant Past and Present Performance**

### **5.1 General**

Each offeror shall submit a past and present performance volume with its proposal, containing past performance information in accordance with the format contained in Attachment 2. This information is required on the offeror and all subcontractors, teaming partners, and/or joint venture partners proposed to perform 25 per cent of the proposed effort based on the total proposed price, or perform aspects of the effort the offeror considers critical to overall successful performance. Offerors are cautioned that the Government will use data provided by each offeror in this volume and data obtained from other sources in the evaluation of past and present performance.



The offeror shall submit, along with the information required in this paragraph, a consent letter, executed by each subcontractor, teaming partner, and/or joint venture partner, authorizing release of adverse past performance information to the offeror so the offeror can respond to such information. For each identified effort for a commercial customer, offeror shall also submit a client authorization letter, authorizing release to the Government of requested information on the offeror's performance.

## 5.2 Early Proposal Information

Each offeror is requested to submit the information shown in Attachment 2 for each relevant contract 15 days before the date set for receipt of proposals. Failure to submit early proposal information will not result in offeror disqualification.

## 5.3 Relevant Contracts

Submit information in accordance with Attachment 2: Past Performance Information on five recent contracts that you consider most relevant in demonstrating your ability to perform the proposed effort. Also include information on five recent contracts performed by each of your teaming partners and significant subcontractors that you consider most relevant in demonstrating their ability to perform the proposed effort. Include rationale supporting your assertion of relevance. For a description of the characteristics or aspects the Government will consider in determining relevance, see Section M, provision M002 - Evaluation Factors, paragraph M002e - Past Performance Factor. Note that the Government generally will not consider performance on a newly awarded contract without a performance history or on an effort that concluded more than ten years before this source selection.

### 5.3.1 Specific Content

Offerors are required to explain what aspects of the contracts are deemed relevant to the proposed effort, and to what aspects of the proposed effort they relate. This may include a discussion of efforts accomplished by the offeror to resolve problems encountered on prior contracts as well as past efforts to identify and manage program risk. Merely having problems does not automatically equate to a little or no confidence rating, since the problems encountered may have been on a more complex program, or an offeror may have subsequently demonstrated the ability to overcome the problems encountered. The offeror is required to clearly demonstrate management actions employed in overcoming problems and the effects of those actions, in terms of improvements achieved or problems rectified. This may allow the offeror to be considered a higher confidence candidate. For example, submittal of quality performance indicators or other management indicators that clearly support that an offeror has overcome past problems is required. Categorize the relevance information into the specific Mission Capability subfactors used to evaluate the proposal.

### 5.3.2 Organizational Structure Change History

Many companies have acquired, been acquired by, or otherwise merged with other companies, and/or reorganized their divisions, business groups, subsidiary companies, etc. In many cases, these changes have taken place during the time of performance of relevant present or past efforts or between conclusion of recent past efforts and this source selection. As a result, it is sometimes difficult to determine what past performance is relevant to this acquisition. To facilitate this relevancy determination, include in this proposal volume a "roadmap" describing all such changes in the organization of your company. As part of this explanation, show how these changes impact the relevance of any efforts you identify for past performance evaluation/ performance confidence assessment. Since the Government intends to consider present and past performance information provided by other sources as well as that provided by the offeror(s), your "roadmap" should be both specifically applicable to the efforts you identify and general enough to apply to efforts on which the Government receives information from other sources.

**PERFORMANCE SPECIFICATION**

**FOR**

**REPLACEMENT OF THE PROPULSION WIND TUNNEL**

**MAIN DRIVE STARTING SYSTEM**

**ARNOLD ENGINEERING DEVELOPMENT CENTER**  
**ARNOLD AIR FORCE BASE, TENNESSEE 37389-9998**

## 1. SCOPE

1.1 Scope of Work: This specification establishes the performance requirements to replace the PWT (**P**ropulsion **W**ind **T**unnel) MD (**M**ain **D**rive) Starting System at Arnold Engineering Development Center (AEDC) with a upgraded replacement utilizing more powerful motors, power electronics, fully automated controls, and motor replacement shafts to permit operation with some motors removed from the PWT MD drive train. The existing PWT MD Starting System consists of two 35,000-HP starting motors, their associated liquid rheostats and the PWT MD hard-wired relay based controls. The Contractor shall provide a replacement PWT MD Starting System with upgraded motors, adjustable speed drive systems, and programmable automatic remote controls, and with performance in accordance with Section 3. Because this specification does not require a particular adjustable speed drive technology, the adjustable speed drive, including any associated input and/or output transformers, is referred to as a “power electronics set” in this specification.

2. **APPLICABLE DOCUMENTS**: The following documents shall be a part of this specification to the extent referenced herein.

### 2.1 Government Documents:

- a. AEDC 02080 Asbestos Removal
- b. AEDC 02085 Lead Removal

### 2.2 Non-government documents:

#### 2.2.1 Standards:

##### 2.2.1.1 National Electrical Manufacturers Association (NEMA):

- a. ICS 1-93, Industrial Control and Systems General Requirements
- b. ICS 2-93 Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC
- c. ICS 3.1-98, Handling, Storage and Installation Guide for AC General-Purpose Medium Voltage Contactors and Class E Controllers, 50 and 60 Hertz.
- d. ICS 4-93, Industrial Control Systems and Factory Built Assemblies
- e. ICS 5-93 Industrial Control and Systems Control Circuit and Pilot Devices
- f. ICS 7-93, Industrial Control and Systems Adjustable-Speed Drives
- g. ICS 7.1-95, Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems
- h. MG 1-98, Motors and Generators
- i. SG 4-90, Alternating-Current High-Voltage Circuit Breakers
- j. SG 5-95, Power Switchgear Assemblies
- k. TR 1-93, Transformers, Regulators and Reactors

##### 2.2.1.2 American Society of Mechanical Engineers (ASME):

B31.3-99, Process Piping

##### 2.2.1.3 Institute of Electrical and Electronics Engineers (IEEE):

- a. C2-1997, National Electrical Safety Code

- b. C37.20.2-93, IEEE Standard for Metal-Clad and Station-type Cubicle Switchgear
- c. C57.16-96, Standard Requirements, Terminology and Test Code for Dry-Type Air-Core Series-Connected Reactors
- d. C63.12-87, Electromagnetic Compatibility Limits – Recommended Practice
- e. 100-1996, Standard Dictionary of Electrical and Electronics Terms
- f. 115-1995, Test Procedures for Synchronous Machines
- g. 142-1999, Recommended Practice for Grounding of Industrial and Commercial Power Systems
- h. 295-69, Standard for Electronics Power Transformers
- i. 444-92, Standard Practices and Requirements for Thyristor Converters for Motor Drives Part I – Converters for DC Motor Armature Supplies
- j. 519-92, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
- k. 1100-1999, Recommended Practice for Powering and Grounding Electronic Equipment

2.2.1.5 National Fire Protection Association (NFPA):

70-99, National Electrical Code

2.2.1.6 American National Standards Institute (ANSI):

C50.10-1990, Rotating Electrical Machinery - Synchronous Machines

2.2.1.7 Instrument Society of America (ISA):

S84.01-1996, Application of Safety Instrumented Systems for the Process Industries

2.2 Order of Precedence: In the event of conflict between the text of this document and the references cited, the text of this specification takes precedence. Nothing in this specification supersedes applicable laws and regulations.

### 3. **PERFORMANCE REQUIREMENTS**

3.1 Item definition: The replacement PWT MD Starting System shall be an upgraded functional replacement for the existing circa 1950 PWT MD Starting System. PWT MD consists of four large AC motors, M1, M2, M3, and M4, associated controls, and auxiliaries. PWT MD operates connected to either the 16T compressor or the 16S compressor. The 16T compressor consists of the C1 compressor. The 16S Compressor consists of the C2, C3, C4, and C5 compressor barrels coupled in tandem. Several combinations of C2 through C5 are used depending on the test conditions. Appendix A lists the most relevant properties of the PWT MD motors and compressors. The existing PWT MD Starting System performs these major functions:

- a. Accelerates the motor and compressor drive train via the M2 and M3 wound rotor induction motors.
- b. Operates the drive train on continuous duty at speeds between 60 and 600-RPM.
- c. Synchronizes the M1 and M4 synchronous motors to the 60-Hz utility line.
- d. Regulates load sharing between the four motors in PWT MD,
- e. Stops the drive train.
- f. Limits the rate of change of power on the 161-Kv system to 60-MW per minute during normal operation, including starts, stops, load changes, and speed changes.

- g. Provides auxiliary electrical power to the PWT facility via the existing 161-Kv/6.9-Kv T2 and T3 motor transformers and existing power centers (unit substations).

The existing starting motor system in PWT MD consists of the following subsystems:

- h. Two wound rotor induction motors and their associated motor transformers and liquid rheostats, and AC line and DC dynamic braking switchgear.
- i. An automatic — but with provision for manual control — hard-wired, relay-based (some relays have been replaced with programmable electronic subsystems), control system principally located in the duplex boards of the PWT Motor Control Room. That existing control system has interconnections to and relays located in the PWT MD motor switchgear, excitation and DC dynamic braking equipment, and motor auxiliaries including, but not necessarily limited to, lubrication systems, mechanical brakes, and the PWT MD emergency generator.

The Contractor shall provide a replacement PWT MD Starting System that performs in accordance with section 3 of this specification. Provide a Replacement PWT MD Starting System that operates PWT MD automatically, with no requirement for human interaction, and is configured for supervisory control over a network connection to a remote operator terminal(s).

3.1.1 Item diagrams: Figure 1 in Appendix A is a schematic diagram of the existing PWT MD drive train. For descriptive purposes in this document, the replacement motors are referred to as M2' and M3', their associated power electronics sets as PE2 and PE3, and their associated transformers as T2' and T3'.

3.1.2 Interface definitions: The replacement starting motor system shall interface with the systems as follows.

- a. Interface drawings are listed in Appendix B. These drawings are for interface locations only. These drawings may not be complete or correct.
- b. The Contractor shall verify all dimensions and interface requirements to ensure that the replacement PWT MD Starting System provided is a complete, fully integrated and operable part of PWT MD.
- c. The Contractor shall provide the replacement PWT MD Starting System so as to minimize facility downtime and avoid interruption to AEDC's ongoing testing mission. The Contractor shall coordinate any additional interfaces through the Contracting Officer, and obtain the approval of the Contracting Officer for such interfaces.

3.1.2.1 Interfaces (See Appendix B for Drawing Numbers):

a. Mechanical Interfaces:

- 1) Foundations for M2 and M3 Drive Motors.
- 2) Existing M1-to-M2 and M4-to-M3 bolted flange couplings. Each flange bolt pattern is unique, because each was align-bored in place when originally installed.
- 3) Cooling Water Supply: at the existing supply line pipe flanges in the M2 and M3 motor pits, and at the supply pipe flanges for the LR2 and LR3 liquid rheostats. See Appendix C for a water quality analysis.
- 4) Thrust Bearing Function: thrust bearing capability for the PWT MD drivetrain is incorporated in the existing M2 and M3 starting motors. The thrust bearing in each starting motor is capable of continuous operation under the thrust imposed by either the 16T or the 16S Compressor.

- b. Electrical Power Interfaces:
  - 1) 161-Kv Bus interface to PWT Switchyard
  - 2) 480-V, 3-ph, 60-Hz from Power Centers 1, 2, and 3
  - 3) 125-V DC ungrounded control power
- c. Machine Condition Monitoring Interfaces
  - 1) Rotor Dynamics Interface
  - 2) Winding Condition Monitoring Interface

3.1.2.2 Cooling water: Interfaces to the existing cooling water lines are shown on the drawings listed in Appendix B. See Appendix C for information regarding 1999 PWT MD Raw Water Quality.

- a. Maximum pressure 150 PSIG
- b. Minimum pressure 80 PSIG
- c. Maximum temperature 85 °F
- d. Minimum temperature 55 °F
- e. Maximum available flow 940 gpm.

3.1.2.2.1 Modifications to existing cooling water system

3.1.2.2.1.1 General: Utilize the existing cooling water system to supply cooling water to the replacement PWT MD Starting System. Integrate the design of the new equipment, including but not necessarily limited to the power electronics sets, with the existing cooling water system.

3.1.2.2.1.2 Available Cooling Water: Verify the adequacy of the available cooling water supply.

3.1.2.2.1.3 Cooling Water System Modifications: The Contractor shall provide any and all design, materials, and labor to connect the existing cooling water supply to the replacement PWT MD Starting System. Make all additions and/or modifications to the cooling water system in accordance with ASME B31.3-99.

3.1.2.2.1.4 System Cleaning: Flush and clean all new and modified cooling water piping and components after installation.

3.1.2.3 Available Electrical Power:

- a. 161-Kv, 60-Hz, 3-phase
- b. 480-V, 60-Hz, 3-phase
- c. 125-V DC, battery source

3.1.3 Major Component List of Existing Government-owned Equipment: The Contractor shall not apply any existing equipment designated as available for use outside of its nameplate rating(s) without supporting analysis and/or documentation that provides justification for such application. The Contractor shall assume ownership of all equipment and materials removed or replaced. The Contractor shall be responsible for removal of all equipment and materials removed or replaced from AEDC.

3.1.3.1 Transformers:

- a. T-315, 161-Kv/13.8-Kv, available for use by the Contractor.

- b. T-316, 161-Kv/13.8-Kv, available for use by the Contractor.
- c. T-3, 161-Kv/6.9-Kv, available for use by the Contractor to supply auxiliary 480-V, 3-ph, 60-Hz power via existing power centers.
- d. T-2, 161-Kv/6.9-Kv, to be removed.
- 3.1.3.2 PWT MD wound rotor induction motors M2 and M3, to be removed.
- 3.1.3.3 Liquid Rheostats LR-2 and LR-3, to be removed.
- 3.1.3.4 Couplings, as follows:
  - a. FC-1, available for use by the Contractor.
  - b. FC-2, index coupling, to be replaced.
  - c. FC-3, index coupling, available for use by the Contractor.
- 3.1.3.6 PWT MD Control System, to be functionally replaced.
- 3.1.3.7 Switchgear cubicles:
  - a. MC-2 and MC-3, available for use by the Contractor.
  - b. MC-1 and MC-4, available for use by the Contractor.
- 3.1.3.8 Dynamic Braking Exciters DB-2 and DB-3, to be removed.
- 3.1.3.9 Motor M2 and M3 foundations, available for use by the Contractor.
- 3.1.3.10 Motor M2 and M3 ventilating blowers, to be functionally replaced.
- 3.1.3.11 PWT MD protective relaying system:
  - a. Existing M1 and M4 motor and T1 and T4 transformer relays, available for use by the Contractor.
  - b. Existing PWT MD combined motor lockout relays, available for use by the Contractor.
  - c. Existing M2 and M3 motor and T2 and T3 transformer relays, to be functionally replaced.
- 3.1.3.12 Existing Mechanical Brakes for 16T and 16S, to be retained in service:
  - a. 16S disc brake designated MB-1
  - b. 16T disc brake designated MB-2
- 3.1.3.13 Existing turning gears, to be retained in service:
  - a. 16T normal designated TG-1
  - b. 16S normal speed designated TG-2
  - c. 16S slow speed designated TG-3 (16S only)
- 3.1.3.14 Existing M2 and M3 lubrication oil systems are available for reuse by the Contractor.
- 3.1.3.15 MCC's (motor control centers, also identified as "control centers" on existing PWT drawings) 1, 2, and 3, are available for use by the Contractor.
- 3.1.3.16 PWT MD's existing cable tray system is available for use by the Contractor, consistent with NFPA-70-99 and IEEE C2-1997.
- 3.1.3.17 PWT MD's existing 150-T (300,000 pounds), 75-T (150,000 pounds), and 20-T (40,000 pounds) fixed bridge cranes will be operated by the Government in support of the Contractor's installation work.

3.2 Characteristics: The Contractor shall provide a replacement PWT MD Starting System with the following functional, physical, performance, and operating characteristics. Provide all equipment with ratings compatible with the performance requirements of this specification.



3.2.1 Performance: Fully Automatic operation, of PWT MD from a remote operator terminal, with the existing PWT MD Control Room unmanned.

3.2.1.1 Integrated System Performance:

- a. Provide fully automatic operation for all operational configurations of motors, motor replacement shafts, and related auxiliaries, including but not necessarily limited to couplings, turning gears, and PWT MD's mechanical brakes.
- b. The power factor at the input to the power electronics sets, PE2 and PE3, shall not be less than 0.95 lagging or leading during any start or operation. Measure the power factor at the secondary of the 161-Kv transformers supplying the replacement PWT MD Starting System.
- c. Provide a replacement PWT MD Starting Motor System that performs in accordance with the input power harmonic restrictions identified in table 10.5 of IEEE 519-92. The point for determination of harmonic content —the PCC (point of common coupling) — shall be at the primary terminals of the 161-KV transformer(s) supplying the PWT MD replacement Starting Motor System. Within the zone from the secondary terminals of the 161-KV transformer(s) supplying the PWT MD replacement Starting Motor System to the motors the Harmonic content shall not exceed the limits of section 10.2 of IEEE 519-92. The intent of this performance requirement is to avoid introducing damaging harmonic distortion into the AEDC 161-Kv power grid.
- d. Provide plant auxiliary electrical power via the existing 6.9-Kv power centers directly from a transformer connected to the 161-Kv utility lines. Provide this auxiliary power independent from the power supply from the T2' and T3' transformers to the new M2' and M3' and the new PE2 and PE3 power electronics sets. Provide new 6.9-Kv switchgear as required to accomplish this requirement. The intent of this requirement is to isolate the new M2' and M3' motors and their associated auxiliary equipment from other PWT MD electrical power supply systems
- e. Provide assignment switchgear arranged to allow:
  - 1) Operation of each new starting motor from either of the power electronics sets.
  - 2) An option for future growth via the addition of new equipment to connect each power electronics set to operate additional synchronous motors at AEDC.

3.2.1.2 Starting and Stopping Performance: In section 3.2.1.2, the 16S Compressor means the C2, C3, C4, and C5 compressors coupled together for operation. In section 3.2.1.2, all PWT MD four motors are in the drive train and available for normal service. Provide a replacement PWT MD Starting System capable, over its design life (see paragraph 3.2.1.4) of the following starting and stopping performance:

- a. With PWT MD coupled to the 16T Compressor, accelerate the drive train in not greater than five (5) minutes under the conditions described in paragraph 3.2.1.2e. That five (5) minute starting time applies for acceleration from standstill to 600-RPM, and includes the time required to synchronize the two existing PWT MD 83,000-HP motors to the 60-Hz utility line.
- b. With PWT MD coupled to the 16T Compressor, stop the PWT MD drive train, via the Contractor provided power electronics and the existing mechanical brakes, from 600-RPM to standstill in not greater than three (3) minutes under the conditions described in paragraph 3.2.1.2e. That three (3) minute stopping time applies for a stop from 600-RPM to standstill. The stop begins when both existing PWT MD 83,000-HP motors are disconnected from the 60-Hz utility line.

- c. With PWT MD coupled to the 16S Compressor, accelerate the drive train in not greater than fourteen (14) minutes under the conditions described in paragraph 3.2.1.2f. That fourteen (14) minute starting time applies for acceleration from standstill to 600-RPM, and includes the time required to synchronize the two existing PWT MD 83,000-HP motors to the 60-Hz utility line.
- d. With PWT MD coupled to the 16S Compressor, stop the PWT MD drive train, via the Contractor provided power electronics and the existing mechanical brakes, from 600-RPM to standstill in not greater than ten (10) minutes under the conditions described in paragraph 3.2.1.2f. That ten (10) minute stopping time applies for a stop from 600-RPM to standstill. The stop begins when both existing PWT MD 83,000-HP motors are disconnected from the 60-Hz utility line.
- e. Prior to starting, the 16T compressor is at atmospheric pressure with its stator blades adjusted for minimum load.
  - 1) Minimum load for the 16T Compressor is 86.8 MW at 600-RPM.
  - 2) For starting 16T, the PES (Plenum Evacuation System) pumps down — reduces the pressure — in the compressor as the drive train accelerates, so as to achieve a final pressure equal to that required for the first test condition.
- f. Prior to starting the 16S Compressor, its stator blades are adjusted for minimum load. The PES reduces the pressure in the 16S compressor to 200-psfa prior to starting, and maintains that pressure during acceleration. Minimum load for the 16S Compressor is 56-MW at 600-RPM.

3.2.1.3 System Control Performance: Provide a replacement PWT MD Starting System, in accordance with NEMA ICS 1-93, ICS 2-93, ICS 4-93 and ICS 5-93, that automatically:

- a. Regulates, during all operating conditions, load sharing among the four PWT MD motors to maximize loading on the motors of like rating with the highest efficiency, and to minimize loading on the motors of like rating with the least efficiency.
- b. Equalizes loading between motors of like rating, in conjunction with appropriate settings of the FC-2 index coupling in the center of the drive train.
- c. Regulates, except during emergency conditions, the rate of change of power input to conform to the restriction of 60-MW per minute on AEDC's utility supply contract.
- d. Synchronizes the existing 83,000-HP motors to the 60-Hz utility lines when initiating 600-RPM constant speed operation.
- e. Transfers, during the stop sequence and when changing from 600-RPM constant speed to adjustable speed operation, sufficient load from the 83,000-HP motors to the new M2' and M3' motors for smooth disconnection of the 83,000-HP motors from the 60-Hz line.
- f. Transfers, during the stop sequence, braking torque from the power electronics set(s) to the existing mechanical brakes at the optimum point in the stop cycle to optimize stress on the starting motors and wear on the mechanical brakes.

- g. Starts the drive train directly from standstill.
- h. Regulates the speed of the PWT MD drive train speed, to within not greater than  $\pm 0.5$ -RPM of the speed set point.
- i. Sequences the operation of all subsystems, components, and auxiliaries, with the exception of bus tie circuit breakers, which may be arranged for manual configuration.
- j. Operates from terminals located in the PWT 16T Control Room and in the existing PWT MD Motor Control Room. The terminal in the existing PWT MD Motor Control Room is for operation of PWT MD for maintenance purposes, both uncoupled and coupled to either the 16T and 16S Compressor.

3.2.1.4 System Design Life: Provide a replacement PWT MD Starting System, including the foundations and mounting hardware for the new motors, with a design life of not less than twenty-five (25) years, for operation averaging two hundred (200) days per year. That design life does not apply to existing Government-provided equipment available for use in the system. Include in the determination of the system design life consideration of the effects of mechanically and electrically induced harmonic vibrations on all system components. The design life duty cycle is five (5) starts and stops per hour, with a rest period of not less than five minutes between successive starts, and with twenty (20) starts and stops per day. Include in the system life analysis:

- a. Determination of the lateral and torsional resonances of the PWT MD drive train. Devise and implement a strategy for mitigating any resonant interactions to preclude damage to any part of the PWT MD drive train during speed changes, constant speed operation, and transient electrical and mechanical disturbances.
- b. An analysis for each operational combination of compressors, motors, and motor replacement shafts in accordance with Table I.

16T	M1	M2	M3	M4	16S
Coupled	Driving	Driving	Driving	Driving	Uncoupled
Coupled	Not Driving	Driving	Driving	Driving	Uncoupled
Coupled	Driving	Not Driving	Driving	Driving	Uncoupled
Coupled	Driving	Driving	Not Driving	Driving	Uncoupled
Coupled	Driving	Driving	Driving	Not Driving	Uncoupled
Coupled	Not Driving	Not Driving	Driving	Driving	Uncoupled
Coupled	Not Driving	Driving	Not Driving	Driving	Uncoupled
Coupled	Not Driving	Driving	Driving	Not Driving	Uncoupled
Coupled	Driving	Not Driving	Driving	Not Driving	Uncoupled
Coupled	Not Driving	Not Driving	Driving	Not Driving	Uncoupled
Coupled	Not Driving	Driving	Not Driving	Not Driving	Uncoupled
Uncoupled	Driving	Driving	Driving	Driving	Coupled
Uncoupled	Not Driving	Driving	Driving	Driving	Coupled
Uncoupled	Driving	Not Driving	Driving	Driving	Coupled
Uncoupled	Driving	Driving	Not Driving	Driving	Coupled
Uncoupled	Driving	Driving	Driving	Not Driving	Coupled

**Table I – PWT MD Operational Combinations**

Operational constraint notes for Table I:

- 1) 16T can operate with any combination of one, two or three energized motors and C1 coupled in the drive train, subject to these constraints:

- a) One of the energized drive motors must be M2' or M3', because M1 and M4 do not have self-starting capability.
  - b) Motors not driving 16T can either be de-energized in the drive train, or replaced by a motor replacement shaft (see paragraph 3.2.1.5d).
  - c) Motors not driving 16T can be removed from the drive train, so long as their removal permits a continuous mechanical connection between energized motors and C1.
- 2) 16S may operate with any combination of three or four energized motors.
- a) Motors not driving 16S can be either be de-energized in the drive train, or replaced by a motor replacement shaft (see paragraph 3.2.1.5d).
  - b) Motors not driving 16S can be removed from the drive train so long as their removal permits a continuous mechanical connection between energized motors and C2.
- 3) 16S may operate with the following combinations of compressors coupled in the drive train:
- a) C2 and C3
  - b) C2, C3, and C4
  - c) C2, C3, C4, and C5
  - d) When 16S operates, compressors not coupled in the drive train are turned by TG-3 to prevent wind milling.

3.2.1.5 System Reliability: All system reliability requirements apply to new and renovated equipment, not to Government equipment designated as available for use by the Contractor. The reliability requirements do apply to the motor foundations and mounting hardware. Provide a replacement PWT MD Starting System with not less than the following system reliability:

- a. An MTBF (Mean Time Between Failure) of not less than 10,000-hours for control components, and a MTTR (Mean Time to Repair) of not greater than 30-minutes for control components.
- b. An MTBF of not less than 40,000-hours for power components, and a MTTR of not greater than six (6) hours for power components.
- c. Provide new M2' and M3' motors and their associated transformers with an:
  - 1) MTBF not less than 40,000-hours.
  - 2) MTTR not greater than thirty-two (32) hours for repairs other than rewinds, repairs that require removal of a motor from the drive train, and repairs that require untanking of a transformer.
  - 3) MTTR not greater than forty (40) weeks for rewinds, and repairs that require removal of a motor from the drive train, or untanking of a transformer.
- d. Provide motor replacement shafts as follows:
  - 1) To transmit not less than 2,000,000-lb-ft of torque at 600-RPM, and withstand the transient torques attendant to worst case electrical fault events.
  - 2) To drive the 16T compressor with the M1 motor removed from the drive train.
  - 3) To drive the 16S compressor with the M4 motor removed from the drive train.
  - 4) To drive either one of the compressors with the new M2' motor removed from the drive train.

- 5) To drive either one of the compressors with the new M3' motor removed from the drive train.
- 6) To accommodate the bolted flange couplings on the existing 83,000-HP M1 and M4 motors which, having been align-bored in place when originally installed, are unique.

3.2.1.6 **Motor Performance:** Provide each new starting motor in accordance with NEMA MG 1-98 and as follows:

- a. Rated for constant speed operation at 600-RPM from a 13.8-Kv, 60-Hz utility line, in tandem with the existing 83,000-HP synchronous motors of PWT MD, with:
  - 1) A nameplate rating not less than 60,000-HP and no greater than 65,000-HP, with a Service Factor (S.F.) of 1.15.
  - 2) Class F insulation with a temperature rise not exceeding the limits for class B insulation in NEMA MG 1-98, paragraph 21.10.2.
- b. Rated for adjustable speed operation from a power electronics set:
  - 1) At not less than 60,000-HP and not greater than 65,000-HP at 600-RPM,
  - 2) For constant torque operation within the speed range of 60-RPM to 600-RPM.
  - 3) With Class F insulation and with a temperature rise not exceeding the limits for class F insulation in NEMA MG 1-98, paragraph 21.10.1.
- c. With an efficiency, including the losses in the motor and power electronics set, not less than:
  - 1) 97% operating at 600-RPM, 60,000-HP minimum, 65,000-HP maximum.
  - 2) 96% operating at 600-RPM, S.F. 1.15 (69,000-HP minimum, 74,750-HP maximum).
  - 3) 95% operating over the speed range of 60-RPM up to 600-RPM.
  - 4) Determine motor efficiency in accordance with IEEE 115-1995 and ANSI C50.10-1990.
  - 5) Determine the efficiency of the power electronics set, taking into account losses in all power conversion components and radiated energy losses, by either of the following methods:
    - a) Analysis, with a detailed explanation of the method used to determine the losses.
    - b) Test, with a detailed explanation of the test methodology.
- d. Sealed insulation systems, on both the rotor and stator windings, capable of passing a test in accordance with NEMA MG 1-98, paragraph 20.18.
- e. Insulation systems, on both the rotor and stator windings, that have been proven in actual service.
- f. With a shaft extension designed to permit removal of the coupling in a mean time not greater than four (4) hours, once the motor has been removed from the drive train. Provide one set of any special tools and/or fixtures required for coupling removal.
- g. A bearing lubrication system that
  - 1) Lifts the motor rotor off the stationary part of the bearing during start-up to reduce friction.

- 2) Provides for lubrication during coast down in the event of a failure of the power to the oil lubrication pumps.
- h. A thrust bearing system capable of continuous operation under the maximum thrust imposed by the either the 16T or the 16S compressor.
- 3.2.1.7 Compatibility Performance Requirements: Provide the following performance features for compatibility with existing equipment:
  - 3.2.1.7.1 Provide a replacement index coupling for existing coupling FC-2. Provide an index coupling that allows, in concert with the existing FC-3 coupling, angular adjustment (to compensate for the twist in the shafting between the two motors) to align the pole pieces of the M1 and M4 synchronous motors at full power when driving either the 16T or 16S compressors. Provide a replacement index coupling with:
    - a. The capability to transmit not less than 1,400,000-lb-ft of torque at 600-RPM.
    - b. Arrangements that permit change over from the 16T to the 16S configuration in a mean time not greater than 4-hours.
  - 3.2.1.7.2 Provide new M2' and M3' starting motors suitable for operation with Mobil DTE Oil Heavy Medium, the standard PWT MD lubricating oil.
  - 3.2.1.7.3 Provide all existing operational capabilities in accordance with section 3 of this specification. **Do not** provide the following capabilities:
    - a. Split operation of PWT MD, with M1 and M2' driving 16T and M3' and M4 driving 16S.
    - b. Manual control from the duplex switchboards in the PWT MD Control Room.
    - c. Slow speed operation with one starting motor braking and the other driving.
  - 3.2.1.7.4 Provide a replacement PWT MD Starting System capable of remotely controlled operation from the Government's existing GE Cimplicity™ HMI via an open industry- standard interface, e.g., OPC (OLE for process control). All functions provided by the remote operator terminals described in section 3.2.1.3j shall be capable of being implemented via the open interface. All parameters monitored by the local control system described in section 3.4.7 shall be capable of being monitored by the existing government HMI.
  - 3.2.1.7.5 Integrate in the monitoring and control system the power distribution protection and monitoring, PWT MD Starting System controls, required utilities, motor instrumentation, remote controls, and data acquisition. Provide operational summary data and configuration parameters via a standard protocol supported by GE Cimplicity™ HMI to an operator. Provide all diagnostic and monitoring equipment and software, interposing relays, and signal conditioning to interface with the existing PWT systems. The Contractor shall provide:

- a. Capability, via a standard protocol supported by GE Cimplicity™ HMI, to access the PWT MD Starting System fault history, whether the system is on or off-line, to also display and print the fault history record, and monitor Main Drive status.
- b. Provision to accept, via a standard protocol supported by GE Cimplicity™ HMI, an external signal to automatically control the speed of the PWT MD to regulate the conditions in the test section of the wind tunnel.

#### 3.2.1.8 Safety Performance Requirements:

- a. Provide all new electrical installations in accordance with NFPA 70-99 and IEEE C2-1997.
- b. Provide all automated safety instrumented systems in accordance with ISA S84.01-1996.
- c. Design all hardwired circuits to fail-safe de-energized.
- d. Design the replacement PWT MD Starting System to meet all safety requirements of NEMA ICS 3.1-98, NEMA ICS 7.1-95, NFPA 70-99, and IEEE C2-1997.
- e. Provide all equipment in grounded enclosures with no exposed energized parts or terminations. Provide maintenance access doors. Provide all access doors with provisions for padlocks to exclude unauthorized personnel. Employ interlock switches where required to protect maintenance personnel. Ground all non-current carrying electrically conductive components and supporting hardware.
- f. Provide each power electronics set with a means for electrical disconnection from the secondary side of its input power transformer(s) to allow isolation for safe personnel access.
- g. Provide, for the assignment switchgear, and 6.9-Kv auxiliary power center switchgear, a means within the PWT MD Starting Motor System to detect a circuit breaker pole that fails closed. Arrange for such a failure to generate an appropriate fault signal to alert personnel to the problem and to prevent damage to any other part of the PWT MD Starting Motor System.
- h. AEDC safety requirements require providing a air gap in all electrical power supply circuits to drive motor(s) whenever personnel work on the any part of the drive train. Provide a means to rack out motor and power electronics set switchgear without exposing any personnel to the risk of injury or death from circuit breaker arcing due to mechanical or electrical faults in the circuit breaker. Any such means that requires:
  - 1) The presence of personnel within the hazard zone around a circuit breaker during racking into or out of a **live (energized) line-side bus** is not acceptable.
  - 2) A mean time greater than two (2) minutes, to rack in or to rack out, any one circuit breaker is not acceptable. That two (2) minute mean time includes any time required for personnel to set up (prepare for use) and also tear down (remove after use) equipment, such as portable remote power racking devices, required to prepare to rack a circuit breaker.
  - 3) Manual racking of circuit breakers into or out of a **dead (de-energized) line-side bus** is acceptable.

3.2.1.9 Maintainability: Provide a PWT MD Starting Motor System design that includes features to simplify all maintenance actions and minimize all maintenance costs. These features shall include, but are not necessarily limited to, ease of access features, commonality of replacement parts, and clearly documented maintenance manuals and trouble shooting guides. Provide a design that uses, for those parts scheduled for replacement during preventive maintenance, standard commercially available parts and/or materials. Provide, for all similar equipment, items that are interchangeable, except for the new M2' and M3' motors. The existing M2 and M3 motors are mirror images of each other, akin to the relationship of an assembly F-1 motor to an assembly F-2 motor as shown in NEMA MG 1-98, Figure 4-6. The Contractor may provide a similar arrangement of the new M2' and M3' motors if needed to accommodate the existing PWT MD foundations.

- a. Provide five (5) copies of a list of the components of the PWT MD Starting Motor System with manufacturers' data including the MTBF and MTTR for each component. The list shall include notes on any operational or maintenance activities which increase or decrease the life of that component. Provide one copy in an electronic format.
- b. Provide five (5) copies of any and all maintenance manuals necessary for all elements of the PWT MD Starting Motor System. Provide one copy in an electronic format.
- c. Provide, as part of a Preventative Maintenance Plan, five (5) copies of the literature and descriptive diagrams describing in detail the operation and maintenance of all items furnished under this contract. Provide one copy in an electronic format. Present the Preventative Maintenance Plan at the CDR.
- d. Provide five (5) copies, sheet size "D", of any and all of the drawings required for maintenance of all items furnished under this contract.
- e. Provide AutoCAD 2000™ compatible electronic drawing files, in a ".dwg" format, of all drawings required for maintenance of all items furnished under this contract. Provide any and all pen plot files associated with those electronic drawings.
- f. Provide five copies of a list of spare parts required to maintain all items furnished under this contract. Provide one copy in an electronic format. Provide the spare parts listed in the quantity recommended to ensure reliability during the start-up and first year's operation of the PWT MD Starting System. Deliver the spare parts at the same time as the associated equipment. Provide the following operational backup items to avoid unplanned interruptions to testing.
  - 1) A spare circuit breaker of every rating in each circuit breaker line-up.
  - 2) A spare set of brushes for the M2' and M3' motors.
  - 3) One (1) spare integral and fractional horsepower motor of each model number or style number used in the replacement PWT MD Starting System.

3.2.1.10 Electromagnetic Interference Control: Suppress electromagnetic interference (EMI) in accordance with IEEE C63.12-87. Provide power electronics sets that:

- a. Prevent electromagnetic interference from entering the incoming and outgoing power and control lines.



- b. Attenuate any radiated electromagnetic interference to levels that will not affect sensitive electronic and communications systems outside of the boundary of the power electronics sets.
- c. Are protected against radiated electromagnetic interference from any external sources. Provide the Contracting Officer with the design emission figures and / or certifications of previous approval by the FCC (Federal Communications Commission) and any other government agencies.
- d. Do not produce RFI (radio frequency interference) or EMI that is:
  - 1) Audibly detectable over the existing PWT intercom or paging system.
  - 2) That causes movement, improper operation, or false readings in any PWT MD plant control circuit or any PWT MD plant controller instrumentation circuit.

### 3.2.2 Physical Characteristics:

3.2.2.1 Space limitation: All new equipment shall fit within the outdoor area in the immediate vicinity of PWT MD and within Building 780 as indicated on the contract drawings (see Appendix B), with sufficient clearance space for maintenance and code compliance. The Contractor shall be responsible for verifying clearances and other limitations and installing the replacement PWT MD Starting System taking into consideration all relevant restrictions. The Contractor shall provide:

- a. New M2' and M3' motors to fit on the existing foundations for the M2 and M3 wound rotor induction motors. Provide all design, labor, and material for modifying the existing foundations to accommodate the new motors.
- b. All design, labor, and material for modifying the existing PWT 161-Kv switchyard to accommodate the replacement PWT MD Starting System.
- c. All auxiliaries, subsystems, and modifications to existing equipment necessary for a successful implementation of the replacement PWT MD Starting System.

3.2.2.2 Weight Limitation: Provide new M2' and M3' starting motors with a total installed weight for each motor, complete with bearing pedestals and all enclosure parts, that does not exceed one hundred twenty-five (125) tons (250,000-lbs.).

### 3.2.3 Environmental conditions: Site conditions are as follows:

- a. Mean annual temperature: 59°F
- b. Record high temperature: 106°F
- c. Record low temperature: -13°F
- d. Mean annual precipitation: 54-in
- e. Mean annual snow and sleet: 6-in
- f. Elevation: 1103-ft above mean sea level

For those parts of the PWT MD Starting System installed inside Building 780, provide components designed for a 32°F minimum to a 110°F maximum ambient temperature with 95 percent relative humidity conditions.

3.2.3.1 Motor Enclosures: Provide TEWAC (totally enclosed water-to-air cooled) enclosures in accordance with NEMA MG 1-98, section 1.26.7, for the new M2' and M3' motors.

- a. Provide protection against motor winding damage due to water leaks in the air-to-water heat exchanger.

- b. Provide detection of water leaks in the air-to-water heat exchanger.
  - c. Provide a means to drain all water from the heat exchanger for maintenance.
  - d. Provide a means of preventing moisture from condensing on the motor's windings when the motor is not in service. Space heaters are an acceptable means.
- 3.2.3.2 Switchgear: Provide category B enclosures in accordance with IEEE C37.20.2-93, Table A.1, with flanged access doors equipped with grounds, stops, and a door latching mechanism. Provide outdoor switchgear with walk-in enclosures in accordance with IEEE C37.20.2-93, paragraph 6.2.12b), and thermostatically controlled space heaters.
- 3.2.3.3 Oil-Filled Power Transformer Spill Containment: The Contractor shall provide a means for spill containment for all newly installed or relocated oil-filled power transformers.
- 3.2.3.4 Liquid Rheostat Demolition: Remove the liquid rheostats and their associated sub-systems, including but not necessarily limited to, the electrolyte-to-raw water heat exchangers, supply pumps, pump motors, piping and valves to the flange at the raw cooling water supply header pipe, electrical bus bars, and control systems. The Government will drain the liquid rheostats and the water and electrolyte lines associated with the liquid rheostats, dispose of the electrolyte, and clean and neutralize the outdoor sumps. The Government will handle properly containerized hazardous waste. The liquid rheostats contain asbestos insulation and may contain lead paint. The Contractor shall dispose of asbestos in the AEDC landfill, and turn properly containerized lead waste over to the Government as hazardous waste. The Contractor shall comply with all provisions of AEDC 02080 and 02085 while removing asbestos and lead paint.

### 3.3 Design and Construction:

- 3.3.1 Scope: The scope of work includes all design, fabrication, demolition, installation, integration, and verification required to interface the new equipment with existing equipment in a safe, efficient, and timely manner.
- 3.3.2 Design Criteria: The following criteria identify required design work, but not necessarily all of the design work required for a completely operational system.
- 3.3.2.1 Site Visits and Field Verification: Participate in sufficient site visits, discussions with AEDC personnel, and contacts with manufacturers of existing equipment at PWT MD, to gather all information required to provide a PWT MD Starting System that will perform in accordance with the requirements of section 3.2.
- a. Because of AEDC mission requirements, the Government may limit the times during which the Contractor can visit the site. AEDC mission requirements may limit access times to holidays, weekends, and nighttime, hours other than the Monday through Friday 8:00 AM to 5:00 PM normal business hours.
  - b. AEDC will provide, subject to the Contractor upon request any and all existing documentation including drawings, design calculations, and any other relevant information to facilitate the Contractor's work. That documentation shall be for information only. The Contractor shall verify in the field all information critical to the design and installation of the PWT MD Starting System.

- c. Any documents provided will be subject to normal AEDC security reviews prior to release to the Contractor. Security processing may require up to fourteen (14) days.
  - d. The Contractor shall notify the Contracting Officer fourteen (14) calendar days prior to visiting the site to allow time for processing of site passes. The Contractor shall allow a total of thirty (30) calendar days to process required clearances for foreign nationals who do not have green cards.
- 3.3.2.2 Manufactured Components and Materials: Provide commercially available components and materials. Handle, store, apply, install, service, and use manufactured items and materials incorporated into the replacement PWT MD Starting System in accordance with the manufacturer's instructions and recommendations. Provide only new materials and new equipment. Used, salvaged, rebuilt, or remanufactured products and materials are not acceptable, except for the Government-owned interfaces and equipment designated in this specification as available for use by the Contractor.
- 3.3.2.3 Initial Program Review: Conduct a initial program review (IPR) at AEDC no later than three (3) weeks after the effective date of the contract award (ACA). The content shall include the program schedule, a technical overview, and the Contractor's points of contact.
- 3.3.2.4 Preliminary Design Review: Conduct a preliminary design review (PDR) at AEDC when the system design is approximately 35% complete. Present the results of the FMEA (Failure Modes and Effects Aalysis) for the preliminary design, including design revisions, as a part of this review. Provide content demonstrating that the replacement PWT MD Starting System will meet the performance requirements of this specification.
- 3.3.2.5 Critical Design Review: Conduct a critical design review (CDR) at AEDC when the system design is approximately 90% complete. Provide content demonstrating that:
- a. The replacement PWT MD Starting System will meet the performance requirements of this specification.
  - b. Issues raised at the Preliminary Design Review have been resolved.
  - c. The final system design incorporates the results of the FMEA.
- 3.3.2.6 Functional Configuration Audit: Provide a list of the functions of each system and subsystem of the replacement PWT MD Starting System. Provide documented verification that each system and subsystem performs in accordance with the specification performance requirements.
- 3.3.2.7 Physical Configuration Audit: Provide documented verification of the locations of all physical components of each system and subsystem of the replacement PWT MD Starting System.
- 3.3.2.8 Test Readiness Review: At a TRR (Test Readiness Revue) held at AEDC not less than one week prior to any operation of each new motor, the Contractor shall present the results of the audits of paragraphs 3.3.2.6 and 3.3.2.7. This review ensures that all required installation, support, and subsystems will be ready by the time the motor(s) operates.
- 3.3.2.9 Architectural Design: Include in any modifications to existing structures all work necessary to restore the structure to structural integrity, function, and style to preclude a patchwork appearance.

- 3.3.2.10 Structural/Civil Design: Employ a qualified, experienced structural engineer familiar with large foundation dynamics for any modifications to the existing PWT MD foundations, floors or ceilings. Provide an analysis of the existing foundations and structures to determine what, if any, modifications are necessary to safely accommodate the replacement PWT MD Starting System
- 3.3.2.11 Electrical Design: Employ qualified, experienced electrical engineers familiar with high voltage power distribution, solid state power conversion, large motor/generator design, filter networks, and digital control systems. The Contractor's design shall include:
- a. Protective relaying that provides a level of protection not less than that provided by the existing protective relaying system at PWT MD. Provide isolation switchgear and / or switches that ensure a degree of fault isolation and protection not less than that provided by the existing electrical system at PWT MD.
  - b. Grounding and ground grid details, conduit, and equipment locations, interconnecting cabling/ductwork, low voltage power distribution, control, and monitoring.
  - c. Control, monitoring, protection, and time-current coordination with AEDC's existing power distribution system.
    - 1) Provide time-current curves starting at the AEDC 161-Kv substation.
    - 2) Provide time-current plotted on a single piece of graph paper for all devices that are to operate selectively using a common current scale, with current ratings at the lowest voltage level. Plot the curves progressively as each circuit is studied, starting with the device furthest from the source. Each curve on the graph shall include a tolerance band and shall show the degree of coordination with each successive device.
    - 3) Coordination of adjustable and nonadjustable protective devices to operate on the minimum current that permits distinguishing between fault and load current in the minimum time. Select time and current settings for the adjustable devices that will operate in sequence with the nonadjustable devices to isolate a fault with a minimum of disturbance to the unfaulted portion of the system.
    - 4) No series-rated electrical distribution equipment; such equipment is not acceptable.
  - d. Include routing for high voltage bus duct or other raceway(s) between the PE2 and PE3 power electronics sets, M2' and M3' motors, switchgear, transformers, and other components.
  - e. Identify all electrical interfaces between the replacement PWT MD Starting System and the existing PWT MD equipment.
  - f. Identify specific disconnection points between the replacement PWT MD Starting System and the existing electrical systems.
- 3.3.2.12 Mechanical Design: Include calculations for system component sizing and equipment selection. Coordinate location and size of all new lines and piping. Account for all existing piping and utilities and resolve any conflicts between existing and proposed new work. Identify and determine the loads imposed on existing utilities by the replacement PWT MD Starting System, and proposed locations for all utility connections.

- a. Alignment: Align the PWT MD drive train to minimize vibration and mechanical stress.
  - b. Interfaces: Identify all mechanical interfaces, including, but not necessarily limited to, compressed air, cooling water, and lubricating oil, between the replacement PWT MD Starting System and the existing equipment.
- 3.3.2.13 Integrated Project Schedule: Provide a detailed schedule, with milestones, for all field investigations, design, fabrication, manufacturing, logistics, personnel mobilization, installation, and checkout work necessary to complete the work under this specification. Provide schedule information in both a Gantt chart and a CPM chart format. Include individual work elements for each activity. Include work elements that correspond to each line item in Table II, Performance Requirements Verification Matrix. Show start and end dates for each work element, as well as work sequence, time sequence, and other pertinent interrelationships between all work elements. Provide progress reports and revised schedules weekly while work is being performed at AEDC and monthly when no work is being performed at AEDC.
- 3.3.3 Engineering Studies and Calculations: Engineering data required under this section includes all calculations, computations, computer printouts, graphs, presentations, and details of design analyses. Tabulate, organize, and bind required information so that all pertinent information (the weight of equipment, imposed loads, limits, dimensional checks, references, and assumptions) is readily identified. Submit any consulting engineering subcontractor efforts that pertain directly or indirectly to the design and manufacture of this equipment and result in any correspondence, information, reports, and/or other data in the same format. The following studies are required.
  - 3.3.3.1 Short Circuit: Provide a complete short circuit study. Calculate three phase, line-to-line, and line to ground short circuit levels and X/R ratio's at all major elements of the electrical power system. Provide a single line diagram with bus and branch identification, as used in the study. Provide all data and assumptions used in the calculation.
  - 3.3.3.2 Protective Device Coordination: Provide a protective device coordination study that selects proper settings and device characteristics to provide optimum equipment protection, continuity of service, and complete selective coordination. Confirm that all equipment is applied within published ratings, considering the worst case short circuit fault current available.
    - a. Calculate the proper burden class for all current transformers.
    - b. Provide time-current curves for each protective device.
    - c. Assume worst case short circuit fault current available for coordination margin determinations.
    - d. Provide breaker and relay settings in a tabulated format.
    - e. Provide power electronics set and motor trip characteristics in a time-current curve format.
    - f. Where harmonic content may affect relay operation if standard practices are employed, make specific provisions in the design and selection of components to assure proper equipment protection and selective coordination. Document any deviations from standard practices necessary to compensate for harmonic content.
  - 3.3.3.3 Harmonic Analysis and Filter Design: Provide an analysis of the power system that determines harmonics for all operating conditions. Design any filter(s) required to comply with IEEE 519 recommendations, taking into account TVA (Tennessee Valley Authority) power factor restrictions, and the network impedance. Provide a filter that does not cause resonance within the power system at any harmonic frequency. Perform a simulation verifying that the filter characteristics meet design requirements under all operating conditions.

- 3.3.3.4 Load Calculations and Voltage Regulation Analysis: Provide load calculations to determine the size of system components, interconnections, and source requirements. Provide voltage regulation profiles for equipment buses over extremes of power supply and load conditions. Tabulate the results and include them as a section of the load calculations.
- 3.3.3.5 Efficiency Calculations: Calculate the motor efficiency, power electronics set efficiency, and combined system efficiency at loads of 115%, 100%, 75%, 50%, and 25% at 600-RPM, and for 100%, 75%, 50%, and 25% of the 600-RPM full load torque over the speed range of 60-RPM to 600-RPM. Include detailed information as to basic assumptions, the power consumed by sub-systems (such as bearing lubrication systems, cooling systems, excitation systems, and other auxiliaries) necessary for motor and power electronics set operation. Calculate efficiencies in accordance with section 3.2.1.6.
- 3.3.3.6 Insulation Coordination: Determine and document the Basic Insulation Level (BIL), Basic Switching Level (BSL) ratings, and surge protection equipment requirements for the new equipment.
- 3.3.3.7 Motor and Compressor System Analysis: Provide complete torsional and lateral vibration analyses of the PWT MD drive train. Include determination of resonance points, critical speeds, forcing functions, and damping requirements. Select damping components, torque limiting devices, and acceleration and deceleration rates, to optimize system performance and minimize cost. Coordinate the design of the replacement PWT MD Starting System with the existing equipment to ensure that torsional and lateral vibrations do not produce any adverse affects (including torsional pulsations and vibrations) on the new or existing PWT MD equipment. Data on the PWT MD equipment is provided in Appendix A.
- a. Perform separate analysis for each operational combination of compressors, motors, and motor replacement shafts shown in Table I and described in section 3.2.1.4.
  - b. For motors listed as “Not Driving” in Table I, perform separate analyses for each of the following conditions:
    - 1) Motor de-energized, but still in the drive train.
    - 2) Motor removed from the drive train.
    - 3) Motor replacement shaft in the drive train in lieu of the motor.
  - c. Operational combinations are delineated in the notes for Table I.
  - d. Include for each analysis a:
    - 1) Complete description of the method used.
    - 2) Graphic display of the mass-elastic system.
    - 3) Tabulation of the mass moment of inertia and torsional stiffness for each component of the mass-elastic system.
    - 4) Graphic display or expression of exciting pulsating torque or other torsional excitation versus speed.
    - 5) Graphic display of torsional critical speeds and deflections, i.e., a mode shape diagram.
- 3.3.3.8 Failure Modes and Effects Analysis (FMEA): Perform an FMEA on the preliminary design, and apply the results to the final design.

- 3.3.3.9 Subsystem and System Reliability Analysis: Provide a reliability analysis of the replacement PWT MD Starting System. Determine the most probable failure modes, the value of redundant configurations, and show by analysis that the system availability has been optimized.
- 3.3.3.10 Installation Downtime: Provide a study justifying the installation downtime. Address economic, technical, and schedule factors to justify that the installation downtime has been optimized with respect to minimizing both impact on AEDC's mission and the life cycle cost of the replacement PWT MD Starting Motor System.
- 3.3.4 Materials: Provide piping, valves, fittings, and related parts in accordance with ANSI B31.3-99. Provide materials designed and rated for their intended use. Welders' qualifications and procedures shall be in accordance with ANSI B31.3. Do not use any asbestos, lead, or polychlorinated biphenyl's (PCB's).
- 3.3.5 Identification and markings: Provide nameplates for all equipment. Provide motor nameplates in accordance with NEMA MG 1 and adjustable-speed drive nameplates in accordance with NEMA ICS 7. Permanently affix nameplates to each major component. Engrave or emboss all information.
- Mark electrical circuits with warning signs in accordance with OSHA (Occupational Health and Safety Agency) requirements.
  - Identify secondary devices, enclosures, and wiring, with permanently affixed device designation tags, not smaller than 0.75 inches high by 2.0 inches long. Use lettering not less than 0.125 inches high.
  - Attach information plates with corrosion resistant means. Hand lettering, ink marking, and embossed self-adhesive tape tags are not acceptable. Pre-printed self-adhesive tags are acceptable for wiring identification.
- 3.4 Major component characteristics: The Contractor shall be responsible for the integration of all major components of the PWT MD Starting System. All new equipment shall conform to the requirements stated below. These requirements do not apply to existing Government-provided equipment. Maintain all existing electrical and mechanical interfaces to Government-provided equipment and components.
- 3.4.1 Design and Construction: Provide the replacement PWT MD Starting System with motors suitable for operation from power electronics sets. Provide power electronics sets that are completely solid state and microprocessor controlled. Integrate all controls, interlocking, and diagnostic monitoring into digital logic in a non-volatile configuration. Include the following in the basic design and construction of the power electronics sets:
- Operation in not less than the twelve (12) pulse mode.
  - Provide internal connectors of different sizes, types, or with unique keying by function such that misconnection is not possible.
- 3.4.2 Electrical Connections: Provide all devices with copper-to-copper external electrical power connections. Use copper-to-aluminum transition joints to connect external connections to internal aluminum conductors. Pressure welded transition joints or connectors rated by the manufacturer for the highest temperatures occurring at the joint are acceptable. Soldered-type transition joints are not acceptable.
- Use multi-grip compression type lugs for all cable connections.
  - Install and verify all electrical wiring between sub-components and devices.
  - Wire appropriate circuit points to barrier type terminal blocks for equipment interconnections. Provide each terminal block with not fewer than 10 percent of the terminal points as spares for future use.

- d. Bundle together by voltage rating and EMI susceptibility, and route horizontally and vertically throughout each enclosure, all internal wiring not in enclosed raceways.
  - e. Arrange conductors crossing equipment door and access panel edges to permit access without conductor damage.
  - f. Terminate wiring with ring-tongue or spring-spade, crimped-lug terminals, or at terminal blocks. In-line conductor splices are not acceptable.
- 3.4.3 Ground Bus: Provide each enclosure with a copper ground bus adequate for all electrical requirements including worst-case fault conditions. Connect the ground bus in each enclosure to the ground bus in adjoining enclosures, and to the facility's ground grid. Provide power system grounding and bonding in accordance with IEEE 142-1999. Ground sensitive electronic equipment in accordance with IEEE 1100-1999.
- 3.4.4 Converters and Inverters: Design and construct converters and inverters in accordance with NEMA ICS-7 and IEEE 444.
- a. Provide converters and inverters able to withstand a three-phase short circuit current without damage until the current is interrupted by normal circuit breaker operation. Do not use fuses in the converters and inverters.
  - b. Provide a means for monitoring the condition of each thyristor in the "On" and "Off" states that indicates and annunciates failure of a thyristor. Integrate thyristor monitoring into the replacement PWT MD Starting System controller for fault sensing, data logging, and interlocking functions.
- 3.4.5 Reactors: Provide reactors that comply with IEEE C57.16-96, NEMA TR 1-93, and as follows:
- a. With cooling equipment, except for air-cooled reactors cooled by free convection, including interlocks that check for proper operation prior to energizing the reactors, and that alarm in the event of a failure.
  - b. Optimized for harmonic cancellation, current ripple, and di/dt.
  - c. Continuous current ratings not less than the peak current carried under full power operation.
  - d. With a maximum winding temperature not greater than 115° C during continuous operation at full power.
  - e. With a maximum temperature at the electrical terminals less than the rating of the interconnecting conductors.
  - f. Designed to withstand the stresses associated with a worst-case electrical fault for the system's reactor fault clearance design time.
  - g. With a voltage rating suitable for the Contractor's design of the replacement PWT MD Starting Motor System.
  - h. With insulation levels in accordance with IEEE 295-69, and IEEE 444-92.
  - i. With grounding means for all metallic parts not in contact with live reactor conductors.
  - j. With structures designed and fabricated to eliminate eddy currents in non-current carrying structures.
  - k. With lifting lugs or eyes.
- 3.4.6 Switchgear: Provide metal-clad, type MC switchgear in accordance with IEEE C37.20.2-93, NEMA SG-4, NEMA SG-5, and the following:



- a. Provide circuit breakers utilizing a spring-type, stored-energy, operating mechanism charged by a universal motor. Provide the mechanism with a position indicator showing whether the breaker is open or closed.
  - b. Provide circuit breakers with 125-V DC control power circuits.
  - c. Provide draw out type circuit breakers with rugged frames and wheels. Provide a design that shields personnel from high voltages when the enclosure door is open. Provide for ready access to components when switchgear is out of its enclosure. Arrange instruments, relays, control switches, indicating lamps, and similar devices for ease of maintenance.
  - d. Provide circuit breakers that can be locked and tagged in the withdrawn position.
  - e. Provide each circuit breaker with:
    - 1) No fewer than six spare electrically independent single pole auxiliary switch contacts that can be readily changed between form "a" and form "b" configuration.
    - 2) An operation cycle counter.
    - 3) A contact wear-gap indicator that requires no tools to determine available contact wear.
  - f. Provide the switchgear with a terminal compartment for each bus and for each circuit breaker.
    - 1) Provide readily accessible terminal blocks for all external connections.
    - 2) Identify secondary and control wiring at each terminal block.
    - 3) Isolate all secondary and control wiring in separate raceways.
  - g. Identify each compartment of the switchgear assembly by an identification plate showing the circuit function and its functional designation.
  - h. Provide each circuit breaker with local controls and indicators as follows:
    - 1) Fuse block and fuses for the 125-V DC control power.
    - 2) A local test control switch effective only when the circuit breaker is in the test position.
    - 3) Red and green indicating lights in accordance with IEEE C37.20.2-93 paragraph 6.2.13. Connect the red light to indicate trip circuit continuity.
    - 4) A mechanical device to indicate when the breaker is in the operating position and when it is in the test position.
  - i. Provide a continuous rigid copper ground bus and removable element grounding means in accordance with IEEE 37.20.2-93 section 6.1.2. Aluminum bus bars are not acceptable. Electroplate, with tin or silver, the termination and connection points of all bus bars.
  - j. Mount potential transformers (PT's) on draw out carriages in separate compartments in accordance with IEEE C37.20.2-93 sections 6.1.2 and 6.2.6. Provide PT's:
    - 1) That can be locked and tagged in the withdrawn position.
    - 2) With primary current limiting fuses capable of interrupting a short circuit on the carriage.
- 3.4.7 Instrumentation and Control: Provide an instrumentation and control system consisting of all control and interface circuitry integrated with all sensing, operating, protecting, annunciating, display, and recording devices necessary to provide a complete and operable PWT MD Starting System.

- a. Provide the PWT MD Starting Motor System with a self-contained, user-friendly digital controller, tuned to provide optimal and repeatable system performance. Utilize microprocessor-controlled equipment specifically designed for power conversion and drive control applications. Provide a controller of a design that has operated for not less than two years in comparable configurations. Provide software that allows personnel to make routine parameter changes and run built-in diagnostic and monitoring programs without knowledge of a programming language.
  - b. Provide the PWT MD Starting Motor System with control functions that are upgradeable to permit modifications, enhancements, or optimization of sequencing and control characteristics.
- 3.4.8 Diagnostics and Troubleshooting: Provide a PWT MD Starting Motor system controller incorporating self-contained, user-friendly, diagnostic capabilities. Provide routines that:
- a. Continuously monitor the system for faults.
  - b. Include pre-operational system checks before starting a motor.
  - c. Include the following off-line troubleshooting features:
    - 1) Rapid location of faults after an alarm has occurred.
    - 2) Built-in off-line test programs for critical functions that can be activated without additional software programming or modifications.
  - d. Provide a controller with:
    - 1) Troubleshooting capability with low or no voltage in the power section.
    - 2) Capability to exercise thyristor bridge circuits at low voltage levels.
    - 3) Transient data recorders that capture significant signals when a fault occurs for playback from the Government's existing GE Cimplicity™ HMI via a standard protocol supported by GE Cimplicity™ HMI.
    - 4) Provide data recorders:
      - a) With capacity to retain not less than 500-msec of analog data.
      - b) With no fewer than eight (8) channels.
- 3.4.9 Installation of the PWT MD Starting Motor System: Provide all engineering, labor, materials, and equipment to assemble, install, set-up, and checkout the new drive system. Coordinate with the Contracting Officer to abate events (i.e., schedule conflicts with plant operation, security clearances, etc.) that may impede the work. Provide, at the CDR, a Site Installation Plan that identifies the Contractor's installation scope and methods, and includes the following:
- a. Drawings and/or descriptions of the cranes, cribbing assemblies, and rigging assemblies proposed for the installation work.
  - b. An installation procedure describing the step-by-step approach for the installation of each major component or sub-system.
  - c. An installation schedule identifying, for each phase of the installation, the start date, and the duration, interrelationships, interdependencies, and interfaces for each major component or sub-system to be installed.
  - d. Methods to protect existing equipment adjacent to or near the installation area or in the equipment delivery path.

#### 4. VERIFICATION

4.1 Responsibility for Verification: The Contractor shall perform all specified verifications, including inspections and test requirements. The Government may exercise an option to witness factory testing and inspection of new major components prior to shipment. Facilitate this option by notifying the Contracting Officer no fewer than ten (10) days in advance of factory tests and inspections scheduled at factories located in the United States, and no fewer than thirty (30) days in advance of factory tests and inspections scheduled at factories located outside of the United States. The Government may visually inspect new major components after arrival at AEDC for compliance with this specification and submitted documents.

4.1.1 Performance Verification: The Government will provide personnel to operate PWT to support performance testing of the replacement PWT MD Starting Motor System in accordance with the installation plan as approved by the Contracting Officer. Timing of the performance testing is subject to the constraints of AEDC's mission, and may be scheduled on holidays, weekends, and nighttime hours other than the Monday through Friday 8:00 AM to 5:00 PM normal business hours. The Contractor shall demonstrate, via the methods listed in Table II, that the PWT MD Starting System meets the specified performance requirements. Those methods are defined as follows:

- a. Analysis: Analysis consists of systems engineering analysis, math modeling and simulation, statistical evaluation, statistical prediction via historical data extrapolation, and similar techniques in lieu of or to supplement test data. Analysis serves to verify performance requirements including maintainability, design life, and reliability.
- b. Similarity: Similarity consists of providing adequate substantiating data to confirm that the article in question is similar or identical to an article previously qualified in accordance with equivalent or more stringent criteria.
- c. Inspection: Inspection consists of reviewing applicable documents, specifications, drawings and hardware for compliance with construction features, workmanship, quality, dimensional, and similar requirements.
- d. Demonstration: Demonstration is operation under actual or simulated use conditions.
- e. Test: Test is the application of electrical, mechanical, and environmental stimuli and the measurement of specific responses for verification of performance requirements. When analysis, similarity, inspection, or demonstration cannot establish an adequate level of confidence, testing shall be performed.

Paragraph <sup>1</sup>	Requirement	Method <sup>2</sup>					Due Date <sup>3</sup>
3.2.1.1a	Fully automatic remote operation				D		IOC
3.2.1.1b	Power factor					T	IOC
3.2.1.1c	Harmonic content					T	IOC
3.2.1.1d	Independent auxiliary power supply			I			PDR
3.2.1.1e	Assignment Switchgear			I			PDR
3.2.1.2	Starting & Stopping Performance					T	IOC
3.2.1.3a-d	Control performance				D		IOC
3.2.1.3e, f	Stopping performance	A					PDR
3.2.1.3g-j	Control performance				D		IOC
3.2.1.4	Design life	A					PDR
3.2.1.5	Reliability	A					PDR

**Table II - Performance Requirements Verification Matrix (continued on next page)**

Paragraph <sup>1</sup>	Requirement	Method <sup>2</sup>					
3.2.1.6a, b, & c	Motor performance	A					PDR
3.2.1.6d & e	Insulation system performance		S				PDR
3.2.1.6f, g, & h	Motor shaft & bearing design	A					PDR
3.2.1.7.1	FC-2 replacement coupling performance	A					PDR
3.2.1.7.2	Lubrication system performance	A					PDR
3.2.1.7.3	Operational capability	A					PDR
3.2.1.7.4	Control system integration performance	A					PDR
3.2.1.7.5	Control System Integration	A					PDR
3.2.1.8a	NFPA 70 & IEEE C2 Compliance	A					CDR
3.2.1.8b	Safety System Automation	A					CDR
3.2.1.8c	Hard-wired circuitry fail-safe	A					CDR
3.2.1.8d	Safety Standard Compliance			I			CDR
3.2.1.8e	Personnel Safety			I			CDR
3.2.1.8f	Power Electronics Disconnection			I			PDR
3.2.1.8g	Pole Failure Relaying	A					CDR
3.2.1.8h	Circuit Braking Racking Safety				D		IOC
3.2.1.9	Maintainability			I			CDR
3.2.1.9a	MTBF & MTTR for Components			I			CDR
3.2.1.9b	Maintenance Manuals			I			IOC
3.2.1.9c	Preventive Maintenance Plan	A					CDR
3.2.1.9d & e	O and M Literature, Descriptions, & Drawings			I			CDR
3.2.1.9f	Spare Parts List			I			IOC
3.2.1.10a-c	Electromagnetic Interference Control		S				CDR
3.2.1.10d	EMI on PWT MD Subsystems				D		IOC
3.2.2	Physical Characteristics	A					PDR
3.2.3	Environmental Design	A					PDR
3.3.2.1	Site Visits & Field Verification			I			TOO
3.3.2.2	Components & Materials			I			TOO
3.3.2.3	Initial Program Review (IPR)			I			3 weeks after ACA
3.3.2.4	Preliminary Design Review			I			at 35% design
3.3.2.5	Critical Design Review			I			at 90% design
3.3.2.6	Functional Configuration Audit	A					TRR
3.3.2.7	Physical Configuration Audit	A					TRR
3.3.2.8	Test Readiness Review			I			2 weeks before IMO
3.3.2.9	Architectural Design			I			CDR
3.3.2.10	Structural / Civil Design	A					PDR
3.3.2.11	Electrical Design			I			IPR
3.3.2.11a	Protective Relaying	A					PDR
3.3.2.11b	System Details			I			CDR
3.3.2.11c	System Coordination Details	A					CDR
3.3.2.11d	Raceway & Bus Duct Routing			I			CDR
3.3.2.11e	Electrical Interfaces	A					PDR
3.3.2.11f	Disconnection and Integration	A					PDR

**Table II - Performance Requirements Verification Matrix (continued on next page)**

<b>Paragraph<sup>1</sup></b>	<b>Requirement</b>	<b>Method<sup>2</sup></b>					
3.3.2.12	Mechanical Design	A					PDR
3.3.2.12a	Alignment	A					TOO
3.3.2.12b	Interfaces	A					PDR
3.3.2.13	Integrated Project Schedule			I			IPR
3.3.3.1	Short Circuit Study	A					PDR
3.3.3.2	Protective Device Coordination Study	A					PDR
3.3.3.3	Harmonic Filter Study	A					PDR
3.3.3.4	Load Analysis & Voltage Regulation	A					CDR
3.3.3.5	Efficiency	A					CDR
3.3.3.6	Insulation Coordination Study	A					PDR
3.3.3.7	Torsional & Lateral Vibration	A					PDR
3.3.3.8	FMEA	A					PDR
3.3.3.9	Reliability Analysis	A					PDR
3.3.3.10	Installation Downtime Study	A					IPR
3.3.4	Materials			I			CDR
3.3.5	Identification and Marking			I			IOC
3.4.1	Design & Construction			I			PDR
3.4.2	Electrical Connections			I			IOC
3.4.3	Ground Bus			I			IOC
3.4.4	Converters and Inverters – Design	A					PDR
3.4.4a	Converters & Inverters – fault withstand capability	A					CDR
3.4.4b	Converters & Inverters – thyristor monitoring			I			CDR
3.4.5	Reactors	A					CDR
3.4.6	Switchgear			I			CDR
3.4.7	Instrumentation & Control	A					CDR
3.4.8	Diagnostics & Troubleshooting			I			PDR
3.4.9	Installation	A					CDR
4.2.2	General Verification Requirements			I			TOO
4.2.3	Verification Plan	A					CDR
4.2.4	On-Site Verification			I			TOO
4.2.5	On-Site Repair			I			CDR
4.2.6	Special Tools, Fixtures, & test Equipment			I			IOC
4.2.7	Training Plan	A					CDR
4.2.8.1	Warranty Work	A					IPR
4.2.8.2	Technical Support				D		TOO

**Table II - Performance Requirements Verification Matrix (concluded on this page)**

## Notes for Table II:

- 1 Specification paragraph number
- 2 Symbols are follows, see paragraph 4.1.1a —e for a detailed description of each method:
  - “A” – Analysis
  - “S” – Similarity
  - “I” – Inspection
  - “D” – Demonstration
  - “T” – Test
- 3 Due Dates are “not later than dates”. Acronyms used for due dates in Table II are as follows:

ACA	Award of Contract
CDR	Critical Design Review
IMO	Initial Operation of Motors M2’ and M3’
IOC	Initial Operational Capability
IPR	Initial Program Review
PCC	Preconstruction Conference
PDR	Preliminary Design Review
TOO	Time of Occurrence
TRR	Test Readiness Review

### 4.2 Contractor Verifications:

- 4.2.1 Scope: The Contractor shall supply all materials, equipment, and personnel to verify that the replacement PWT MD Starting Motor System meets the performance requirements of Section 3. Perform that work in accordance with Table II - Performance Requirements Verification Matrix.
- 4.2.2 General Verification Requirements:
  - 4.2.2.1 Verification Personnel: The Contractor shall provide personnel experienced in electromechanical drive system equipment checkout and startup for on-site verification. Provide personnel trained on the specific type of equipment used on this project. Provide personnel familiar with the specific requirements and performance criteria for this project. Provide a commissioning engineer to oversee and coordinate all on-site verification activities. The commissioning engineer shall be present for all on-site verification.
  - 4.2.2.2 Verification Equipment: The Contractor shall calibrate and maintain equipment used for verification in accordance with the Contractor’s quality assurance program. Data recorded on equipment with an untraceable or expired calibration is not acceptable.
  - 4.2.2.3 Verification Parts: The Contractor shall replace or repair all parts damaged or consumed, and repair any defects detected during verification.
  - 4.2.2.4 System Measurements: The Contractor shall perform and record system measurements on the completely installed PWT MD Starting Motor System to verify the specified system performance in accordance with Table II - Performance Requirements Verification Matrix.
- 4.2.3 Verification Plan: Provide a performance Verification Plan, in accordance with Table II - Performance Requirements Verification Matrix, at the CDR. Structure the plan to progressively reduce risk, eliminate areas of uncertainty, and minimize PWT MD downtime. Include the following in the plan:

- a. Component, system, and subsystem performance verification prior to shipment to AEDC.
  - b. On-site subsystem performance verification, prior to initial operation of the of the new M2' and M3' motors. Perform performance verifications in accordance with the applicable industrial standards and codes, and the Contractor's or manufacturer's standard practices.
  - c. A functional configuration audit for all systems and subsystems, in accordance with paragraph 3.3.2.6.
  - d. A physical configuration audit for all systems and subsystems, in accordance with paragraph 3.3.2.7.
  - e. Present the results and provide the documentation for the physical and functional configuration audits at the TRR in accordance with paragraph 3.3.2.8.
  - f. A pre-start checkout of the drive system including the following steps:
    - 1) Support AEDC personnel in verification of all instrumentation and controls interfaces.
    - 2) Make and document modifications as required.
    - 3) Provide a copy of the modifications documentation to AEDC personnel
  - g. A mechanical run-in that:
    - 1) Verifies proper operation of system components.
    - 2) Identifies and eliminates systems anomalies.
    - 3) Verifies MCM parameters.
    - 4) Provides for revision of MCM trip and alarm setting as required.
- 4.2.4 On-Site Verification: Perform, in accordance with Table II and the Verification Plan, functional and operational verification of the final installation. AEDC will provide a maximum of twelve (12) hours total of dedicated air-on-time, approximately six (6) hours each for the 16T and 16S Compressors, to support testing of the PWT MD Starting System under load conditions.
- 4.2.5 On-Site Corrections: Provide all labor and materials required for replacing and/or adjusting all system components during on-site acceptance testing at AEDC.
- 4.2.6 Special Tools, Fixtures, and Test Equipment: Provide one set of each type of special tool(s), special test equipment, and fixture(s) required for the maintenance, troubleshooting, testing, and repair of the PWT MD Starting System.
- 4.2.7 Personnel Training: Provide training for AEDC employees on the replacement PWT MD Starting System. Conduct the training program at AEDC. Provide all personnel and relevant materials required for the training program. Approximately thirty (30) AEDC personnel, consisting of engineers, operators, and technicians will attend the training. Conduct the training after the Government accepts the PWT MD Starting System. Present the Training Plan at the CDR.
- 4.2.7.1 Content: Train personnel in the operation, troubleshooting, and servicing of the complete PWT MD Starting System, including software and interfaces. Provide an overview of the integration of the new equipment with the existing PWT MD drive equipment that will remain in service after installation of the PWT MD Starting System is installed.

- 4.2.7.2 Facilities: Conduct the training in a conference room provided by the Government, at AEDC. An overhead projector for use with a laptop computer will be available in the conference room. Include hands-on training sessions with actual equipment installed at PWT MD. Hours for the training class shall be 7:00 AM to 3:30 PM, Monday through Friday, excluding holidays. The training shall be a minimum of forty (40) hours. The training days may not be consecutive and will be scheduled at the discretion of AEDC. AEDC reserves the right to videotape the training sessions for future use and reference.
- 4.2.7.3 Materials: Provide hard copy and/or CD-ROM training materials that give an overview of the system operation, as well as detailed coverage of the mechanical and electrical auxiliaries, controllers, and software functions of the new equipment. Handout materials shall become the property of the Government. Provide a minimum of 20 percent additional copies of the handouts as part of the training material package.
- 4.2.8 Follow-on Support: Provide follow-on support after installation.
- 4.2.8.1 Warranty Work: Provide trained and skilled personnel to provide service for the PWT MD Starting System during the warranty period. Provide all manuals, spare parts, and test equipment required for warranty service. The Contractor's warranty service personnel shall be on call twenty-four (24) hours a day, seven (7) days a week, and shall be stationed so as arrive at AEDC not later than twenty-four (24) hours after notification of the existence of a problem.
- 4.2.8.2 Technical Support: Provide no fewer than six hundred (600) hours of technical support at AEDC during the first twenty-four (24) months after the Government accepts the PWT MD Starting System. That support is for reconfiguration and other special maintenance needs of the PWT MD Starting System. That support shall include one (1) preventative maintenance visit within the first year after acceptance of the PWT MD Starting System. A second preventative maintenance visit shall occur within one (1) year of the end of the warranty period. The preventative maintenance visits shall be at least twelve (12) months apart. The visits shall include support for the preventative maintenance actions required in the Contractor's Preventative Maintenance Plan.

## **5. PREPARATION FOR DELIVERY**

- 5.1 General: The Contractor shall provide all preservation, packing, and packaging to assure safe delivery of the equipment to AEDC. The Contractor shall bear all shipping costs for delivery of the equipment to AEDC.

## **6. NOTES**

- 6.1 Definitions: Unless otherwise stated in this specification, the definitions in IEEE 100-1996 and the documents referenced in Section 2 of this specification apply.
- 6.1.1 Mean time between failure (MTBF): MTBF is the mean number of hours during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.
- 6.1.3 Mean time to repair (MTTR): MTTR is the sum of corrective maintenance times (hours) at any specific level or repair, divided by the total number of failures within an item repaired at that level, during a particular interval under stated conditions.
- 6.1.4 Power Center: At PWT MD, the term "power center" is used to identify a unit substation as defined in IEEE 100-1996.
- 6.1.5 Control Center: At PWT MD, the term "control center" is used to identify a motor control center (MCC) as defined in NEMA ICS 3-93.



- 6.1.6 Bus Tie Circuit Breaker: A circuit breaker used exclusively to interconnect or isolate portions of an electrical circuit. Bus tie circuit breakers are not intended primarily to switch or protect equipment. Bus tie circuit breakers are not intended to open or close during normal operation.
- 6.1.7 Index Coupling: A mechanical connector between two shafts that provides for adjustment of the angular displacement between the two shafts. Often used between two AC synchronous motors connected by shafting that is subject to twisting under load. An index coupling permits alignment of the electrical pole pieces of both machines to equalize their loading at a specified load, generally full load.
- 6.1.8 WK<sup>2</sup>: The rotational inertia about the shaft in engineering units, lb-ft<sup>2</sup>.
- 6.1.9 Emergency Conditions: Abnormal conditions requiring tripping, i.e., removal of power from a motor, power electronics set, transformer, or other major equipment, to protect human life or to prevent extensive damage to equipment.
- 6.2 Acronym List: This listing is in order of appearance in the specification.
- |               |   |
|---------------|---|
| PWT           | Propulsion Wind Tunnel                                    |
| MD            | Main Drive  |
| AEDC          | Arnold Engineering Development Center                     |
| NEMA          | National Electrical Manufacturers Association             |
| ASME          | American Society of Mechanical Engineers                  |
| IEEE          | Institute of Electrical and Electronics Engineers         |
| NFPA          | National Fire Protection Association                      |
| ANSI          | American National Standards Institute                     |
| ISA           | Instrument Society of America                             |
| DC            | direct current  |
| MCC           | motor control center                                      |
| PCC           | point of common coupling                                  |
| PES           | Plenum Evacuation System, part of AEDC's PWT facility     |
| MTBF          | Mean Time Between Failure                                 |
| MTTR          | Mean Time to Repair                                       |
| lb-ft         | pound feet, a measure of torque                           |
| RPM           | revolutions per minute                                    |
| Kv            | kilo-volts, thousands of volts                            |
| Hz            | Hertz, a measure of frequency, formerly cycles per second |
| HP            | horsepower, 746 watts equal one horsepower                |
| GE            | GE Company (i.e., General Electric Co.)                   |
| Cimplicity™   | GE Co. software installed at AEDC's PWT facility          |
| HMI           | Human Machine Interface                                   |
| AutoCAD 2000™ | AEDC's standard computer-aided design software            |
| .dwg          | an AutoCAD™ computer file format designation              |
| EMI           | electromagnetic interference                              |
| FCC           | Federal Communications Commission                         |
| RFI           | radio frequency interference                              |
| °F            | degrees Fahrenheit  |

in	inches
ft	feet
TEWAC	totally enclosed water-to-air cooled
AM	before noon
PM	after noon
IPR	initial program review
ACA	after the effective date of the contract award
PDR	preliminary design review
FMEA	Failure Modes and Effects Analysis
CDR	critical design review
X/R	electrical reactance / electrical resistance
TVA	Tennessee Valley Authority
BIL	Basic Insulation Level
BSL	Basic Switching Level
PCB	polychlorinated biphenyl
OSHA	Occupational Health and Safety Agency
di/dt	rate of change of electrical current with respect to time
°C	degrees Celsius
PT	potential (i.e., voltage) transformer, an instrument transformer
AC	alternating current
msec	milli-second, one one-thousandth of a second
TOO	Time of Occurrence
PCC	Preconstruction Conference
IOC	Initial Operational Capability
OLE	Object Linking and Embedding
OPC	OLE for Process Control
S.F.	Service Factor
Gantt chart	Graphical time sequence schedule in a bar chart format. The placement of each bar corresponds to the start and end time of the work activity. The length of the bar corresponding to the duration of the work activity.
CPM chart	Critical Path Method chart, wherein each work activity is represented by a block. All blocks are depicted in a network that shows the work sequence interrelationship of each block to all other blocks. Each block shows the start and end time of the work activity

## 7. APPENDICES AND ATTACHMENTS

- 7.1 APPENDIX A – PWT MD Equipment Properties
- 7.2 APPENDIX B – Reference Drawing List
- 7.3 APPENDIX C – 1999 PWT MD Water Quality Data
- 7.4 ATTACHMENT D – Asbestos Removal
- 7.5 ATTACHMENT E – Lead Removal

## 7.1 Appendix A: PWT MD Equipment

**Drive Motors:** Westinghouse Electric Corporation, circa 1950, built all four PWT MD motors. They are rated for continuous operation at 60-Hz, and have a rated full load speed of 600-RPM. Motors M2 and M3 were rewound and rerated circa 1980 for continuous operation below 600-RPM. The M2 and M3 wound rotor induction motors were originally operated below 600-RPM only for starting and stopping the drive train. They were originally rated 25,000-HP Continuous, S.F. 2.10 for 2-hours (i.e., 52,500-HP for 120-minutes). The values for  $WK^2$  in  $lb-ft^2$  are approximate.

Motor	Type	Shop Order #	Power Factor	Horsepower	Service Factor	Voltage	Current	Poles	$WK^2$ in $lb-ft^2$
M1	Synchronous	1S43P238	1.0	83,000	1.0	13,200	2,745	12	1,400,000
M2	Wound Rotor Induction	43P226	not applicable	35,000	1.15	6,600	3,095	10	518,000
M3	Wound Rotor Induction	43P226	not applicable	35,000	1.15	6,600	3,070	10	518,000
M4	Synchronous	1S43P237	1.0	83,000	1.0	13,200	2,745	12	1,400,000

**Table III: Properties of PWT MD Motors**

**Compressors:** Westinghouse Electric Corporation, circa 1950, built all five PWT MD compressors. The 16T compressor, C1, was modified circa 1960 to use lightweight, composite rotor blades in place of the original steel rotor blades. Compressors C2, C3, C4, and C5 constitute the 16S Compressor. The values for  $WK^2$  in  $lb-ft^2$  are approximate.

Compressor	$WK^2$ in $lb-ft^2$
C1, original blades (1950 Design)	18,318,800
C1, lightweight blades (Current Condition)	10,720,000
C2	23,394,000
C3	15,466,600
C4	14,637,500
C5	15,908,800

**Table IV: Properties of PWT MD Compressors**

## 7.1 Appendix A: PWT MD Equipment

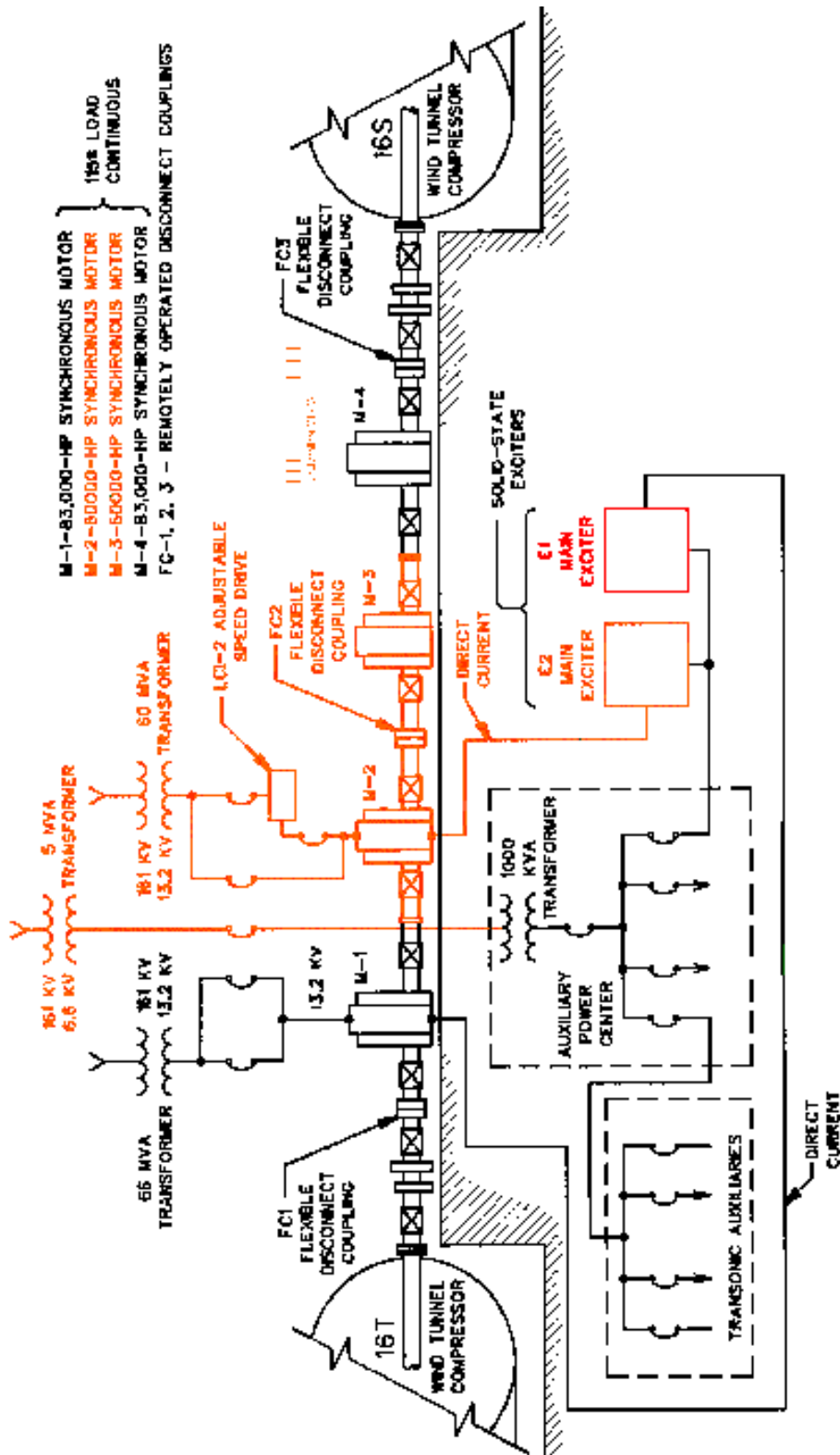


Figure 1: PWT MD With two 60,000-HP Synchronous Motors Replacing the Existing 35,000-HP Wound Rotor Motors. This figure shows only the overall concept, not a detailed design.

## 7.1 Appendix A: PWT MD Equipment

Asset ID	Protective Relay Description	Name
133016	PWT Yard Pilot Wire Relay, 74SPW-1	PWT Rel 74SPW-1
133017	PWT Yard Pilot Wire Relay, 74SPW-2	PWT Rel 74SPW-2
133018	PWT Yard Pilot Wire Relay, 74SPW-3	PWT Rel 74SPW-3
133019	PWT Yard Pilot Wire Relay, 74SPW-4	PWT Rel 74SPW-4
133020	PWT Yard Pilot Wire Relay, 74SPW-5	PWT Rel 74SPW-5
133021	PWT Yard Pilot Wire Relay, 74RPW-1	PWT Rel 74RPW-1
133022	PWT Yard Pilot Wire Relay, 74RPW-2	PWT Rel 74RPW-2
133023	PWT Yard Pilot Wire Relay, 74RPW-3	PWT Rel 74RPW-3
133024	PWT Yard UG94 Pilot Wire Relay, 85L1	PWT UG94 Rel 85L1
133025	PWT Yard UG95 Pilot Wire Relay, 85L2	PWT UG95 Rel 85L2
133026	PWT Yard UG97 Pilot Wire Relay, 85L3	PWT UG97 Rel 85L3
133027	PWT Yard Pilot Wire Relay, Bus Differential 51B, A phase	PWT Rel Aph 51B
133028	PWT Yard Pilot Wire Relay, Bus Differential 51B, B phase	PWT Rel Bph 51B
133029	PWT Yard Pilot Wire Relay, Bus Differential 51B, C phase	PWT Rel Cph 51B
133030	PWT Transformer #1 Overcurrent Relay, A phase	PWT#1 Rel Aph 51T
133031	PWT Transformer #1 Overcurrent Relay, B phase	PWT#1 Rel Bph 51T
133032	PWT Transformer #1 Overcurrent Relay, C phase	PWT#1 Rel Cph 51T
133033	PWT Transformer #1 Overcurrent Relay, Neutral	PWT#1 Rel 51NT
133034	PWT Transformer #1 Differential Relay, A phase	PWT#1 Rel Aph 87T
133035	PWT Transformer #1 Differential Relay, B phase	PWT#1 Rel Bph 87T
133036	PWT Transformer #1 Differential Relay, C phase	PWT#1 Rel Cph 87T
133037	PWT Transformer #1 Trip Suppressing Relay	PWT#1 Rel 87TA
133038	PWT Transformer #2 Overcurrent Relay, A phase	PWT#2 Rel Aph 51T
133039	PWT Transformer #2 Overcurrent Relay, B phase	PWT#2 Rel Bph 51T
133040	PWT Transformer #2 Overcurrent Relay, C phase	PWT#2 Rel Cph 51T
133041	PWT Transformer #2 Overcurrent Relay, Neutral	PWT#2 Rel 51NT
133042	PWT Transformer #2 Differential Relay, A phase	PWT#2 Rel Aph 87T
133043	PWT Transformer #2 Differential Relay, B phase	PWT#2 Rel Bph 87T
133044	PWT Transformer #2 Differential Relay, C phase	PWT#2 Rel Cph 87T
133045	PWT Transformer #2 Trip Suppressing Relay	PWT#2 Rel 87TA
133047	PWT Transformer #3 Overcurrent Relay, A phase	PWT#3 Rel Aph 51T
133048	PWT Transformer #3 Overcurrent Relay, B phase	PWT#3 Rel Bph 51T
133049	PWT Transformer #3 Overcurrent Relay, C phase	PWT#3 Rel Cph 51T
133050	PWT Transformer #3 Overcurrent Relay, Neutral	PWT#3 Rel 51NT
133051	PWT Transformer #3 Differential Relay, A phase	PWT#3 Rel Aph 87T
133052	PWT Transformer #3 Differential Relay, B phase	PWT#3 Rel Bph 87T
133053	PWT Transformer #3 Differential Relay, C phase	PWT#3 Rel Cph 87T
133054	PWT Transformer #3 Trip Suppressing Relay	PWT#3 Rel 87TA
133056	PWT Transformer #4 Overcurrent Relay, A phase	PWT#4 Rel Aph 51T

**Table V: Existing PWT MD Protective Relaying (Continued on next page)**

## 7.1 Appendix A: PWT MD Equipment

Asset ID	Protective Relay Description	Name
133057	PWT Transformer #4 Overcurrent Relay, B phase	PWT#4 Rel Bph 51T
133058	PWT Transformer #4 Overcurrent Relay, C phase	PWT#4 Rel Cph 51T
133059	PWT Transformer #4 Overcurrent Relay, Neutral	PWT#4 Rel 51NT
133060	PWT Transformer #4 Differential Relay, A phase	PWT#4 Rel Aph 87T
133061	PWT Transformer #4 Differential Relay, B phase	PWT#4 Rel Bph 87T
133062	PWT Transformer #4 Differential Relay, C phase	PWT#4 Rel Cph 87T
133065	PWT Main Drive Switchgear-Bus #1 Overcurrent Relay, A phase	PWT B1 Rel Aph 50/51-1
133066	PWT Main Drive Switchgear-Bus #1 Overcurrent Relay, B phase	PWT B1 Rel Bph 50/51-1
133067	PWT Main Drive Switchgear-Bus #1 Overcurrent Relay, C phase	PWT B1 Rel Cph 50/51-1
133068	PWT Main Drive Switchgear-Bus #1 Overcurrent Relay, Alarm	PWT B1 Rel 51AL
133069	PWT Main Drive Switchgear-Bus #1 Differential Relay, A phase	PWT B1 Rel Aph 87-1
133070	PWT Main Drive Switchgear-Bus #1 Differential Relay, B phase	PWT B1 Rel Bph 87-1
133071	PWT Main Drive Switchgear-Bus #1 Differential Relay, C phase	PWT B1 Rel Cph 87-1
133072	PWT Main Drive Switchgear-Bus #1 Phase Balance Relay	PWT B1 Rel 46-1
133073	PWT Main Drive Switchgear-Bus #1 Reverse Phase Voltage Relay	PWT #1 Rel 47-1
133074	PWT Main Drive Switchgear-Bus #1 Ground Detector Relay	PWT B1 Rel 64-1
133075	PWT Main Drive Switchgear-Bus #1 Time Delay Relay	PWT B1 Rel 2T
133076	PWT Main Drive Switchgear-Bus #1 Thermal Relay	PWT B1 Rel 49-1
133077	PWT Main Drive Switchgear-Bus #1 Ground Detector Relay	PWT B1 Rel 64-F1
133078	PWT Main Drive Switchgear-Bus #1 Out-of-Step Relay	PWT B1 Rel 78-1
133079	PWT Main Drive Switchgear-Bus #2 Overcurrent Relay, A phase	PWT B2 Rel Aph 50/51-2
133080	PWT Main Drive Switchgear-Bus #2 Overcurrent Relay, B phase	PWT B2 Rel Bph 50/51-2
133081	PWT Main Drive Switchgear-Bus #2 Overcurrent Relay, C phase	PWT B2 Rel Cph 50/51-2
133082	PWT Main Drive Switchgear-Bus #2 Overcurrent Relay	PWT B2 Rel 51-S2
133083	PWT Main Drive Switchgear-Bus #2 Overcurrent Relay	PWT B2 Rel 51EL2
133084	PWT Main Drive Switchgear-Bus #2 Differential Relay, A phase	PWT B2 Rel Aph 87-2
133085	PWT Main Drive Switchgear-Bus #2 Differential Relay, B phase	PWT B2 Rel Bph 87-2
133086	PWT Main Drive Switchgear-Bus #2 Differential Relay, C phase	PWT B2 Rel Cph 87-2
133087	PWT Main Drive Switchgear-Bus #2 Phase Balance Relay	PWT B2 Rel 46-2
133088	PWT Main Drive Switchgear-Bus #2 Phase Balance Relay	PWT B2 Rel 46-2S
133089	PWT Main Drive Switchgear-Bus #2 Ground Detector Relay	PWT B2 Rel 64-2
133090	PWT Main Drive Switchgear-Bus #2 Frequency Relay	PWT B2 Rel 81T
133091	PWT Main Drive Switchgear-Bus #2 Thermal Relay	PWT B2 Rel 49-2
133092	PWT Main Drive Switchgear-Bus #2 Ground Detector Relay	PWT B2 Rel 64-T
133093	PWT Main Drive Switchgear-Bus #2 Ground Detector Relay	PWT B2 Rel 64-B2
133094	PWT Main Drive Switchgear-Bus #2 Synchronous Speed Device	PWT B2 Rel 13T
133181	PWT Main Drive Switchgear-Bus #2 Reverse Phase Voltage Relay	PWT#2 Rel 47-2
133095	Cubicle 52-2T Overcurrent Relay, A phase	PWT 52-2T Rel Aph 51AX
133096	Cubicle 52-2T Overcurrent Relay, B phase	PWT 52-2T Rel Bph 51AX
133097	Cubicle 52-2T Overcurrent Relay, C phase	PWT 52-2T Rel Cph 51AX
133099	Cubicle 52-3T Overcurrent Relay, A phase	PWT 52-3T Rel Aph 51A
133100	Cubicle 52-3T Overcurrent Relay, B phase	PWT 52-3T Rel Bph 51A
133101	Cubicle 52-3T Overcurrent Relay, C phase	PWT 52-3T Rel Cph 51A
133103	PWT Main Drive Switchgear-Bus #3 Overcurrent Relay, A phase	PWT B3 Rel Aph 50/51-3
133104	PWT Main Drive Switchgear-Bus #3 Overcurrent Relay, B phase	PWT B3 Rel Bph 50/51-3
133105	PWT Main Drive Switchgear-Bus #3 Overcurrent Relay, C phase	PWT B3 Rel Cph 50/51-3
133106	PWT Main Drive Switchgear-Bus #3 Overcurrent Relay	PWT B3 Rel 51-S3
133107	PWT Main Drive Switchgear-Bus #3 Overcurrent Relay	PWT B3 Rel 51EL3
133108	PWT Main Drive Switchgear-Bus #3 Differential Relay, A phase	PWT B3 Rel Aph 87-3
133109	PWT Main Drive Switchgear-Bus #3 Differential Relay, B phase	PWT B3 Rel Bph 87-3
133110	PWT Main Drive Switchgear-Bus #3 Differential Relay, C phase	PWT B3 Rel Cph 87-3
133111	PWT Main Drive Switchgear-Bus #3 Phase Balance Relay	PWT B3 Rel 46-3

**Table V: Existing PWT MD Protective Relaying (Continued on next page)**

## 7.1 Appendix A: PWT MD Equipment

Asset ID	Protective Relay Description	Name
133112	PWT Main Drive Switchgear-Bus #3 Phase Balance Relay	PWT B3 Rel 46-3S
133113	PWT Main Drive Switchgear-Bus #3 Ground Detector Relay	PWT B3 Rel 64-3
133114	PWT Main Drive Switchgear-Bus #3 Frequency Relay	PWT B3 Rel 81-S
133115	PWT Main Drive Switchgear-Bus #3 Thermal Relay	PWT B3 Rel 49-3
133116	PWT Main Drive Switchgear-Bus #3 Ground Detector Relay	PWT B3 Rel 64-S
133117	PWT Main Drive Switchgear-Bus #3 Ground Detector Relay	PWT B3 Rel 64-B3
133118	PWT Main Drive Switchgear-Bus #3 Synchronous Speed Device	PWT B3 Rel 13S
133180	PWT Main Drive Switchgear - Bus #3 Reverse Phase Voltage Relay	PWT#3 Rel 47-3
133119	PWT Main Drive Switchgear-Bus #4 Overcurrent Relay, A phase	PWT B4 Rel Aph 50/51-4
133120	PWT Main Drive Switchgear-Bus #4 Overcurrent Relay, B phase	PWT B4 Rel Bph 50/51-4
133121	PWT Main Drive Switchgear-Bus #4 Overcurrent Relay, C phase	PWT B4 Rel Cph 50/51-4
133123	PWT Main Drive Switchgear-Bus #4 Overcurrent Relay, Alarm	PWT B4 Rel 51AL
133124	PWT Main Drive Switchgear-Bus #4 Differential Relay, A phase	PWT B4 Rel Aph 87-4
133125	PWT Main Drive Switchgear-Bus #4 Differential Relay, B phase	PWT B4 Rel Bph 87-4
133126	PWT Main Drive Switchgear-Bus #4 Differential Relay, C phase	PWT B4 Rel Cph 87-4
133127	PWT Main Drive Switchgear-Bus #4 Phase Balance Relay	PWT B4 Rel 46-4
133128	PWT Main Drive Switchgear-Bus #4 Out-of-Step Relay	PWT B4 Rel 78-4
133129	PWT Main Drive Switchgear-Bus #4 Ground Detector Relay	PWT B4 Rel 64-4
133130	PWT Main Drive Switchgear-Bus #4 Synchronizing Relay	PWT B4 Rel 25
133131	PWT Main Drive Switchgear-Bus #4 Thermal Relay	PWT B4 Rel 49-4
133132	PWT Main Drive Switchgear-Bus #4 Ground Detector Relay	PWT B4 Rel 64-F4
133133	PWT Main Drive Switchgear-Bus #4 Time Delay Relay	PWT B4 Rel 2S
133179	PWT Main Drive Switchgear - Bus #4 Reverse Phase Voltage Relay	PWT#4 Rel 47-4
133134	OCB 552 Overcurrent Relay, A phase	PWT 552 Rel Aph 50/51
133135	OCB 552 Overcurrent Relay, B phase	PWT 552 Rel Bph 50/51
133136	OCB 552 Overcurrent Relay, C phase	PWT 552Rel Cph 50/51
133137	OCB 552 Ground Detector	PWT 552 Rel 64
133138	OCB 552 Thermal Relay	PWT 552 Rel 49
133142	Compressor Auxiliary Relay 38-15	PWT Relay 38-15
133143	Compressor Auxiliary Relay 38-16	PWT Relay 38-16
133144	Compressor Auxiliary Relay 38-16T	PWT Relay 38-16T
133145	Compressor Auxiliary Relay 38-17	PWT Relay 38-17
133146	Compressor Auxiliary Relay 38-17T	PWT Relay 38-17T
133147	Compressor Auxiliary Relay 38-18	PWT Relay 38-18
133148	Compressor Auxiliary Relay 38-19	PWT Relay 38-19
133175	Compressor Auxiliary Relay 38-20	PWT Relay 38-20
133149	Compressor Auxiliary Relay 38-20T	PWT Relay 38-20T
133150	Compressor Auxiliary Relay 38-21	PWT Relay 38-21
133176	Compressor Auxiliary Relay 38-21T	PWT Relay 38-21T
133152	Compressor Auxiliary Relay 38-1	PWT Relay 38-1
133153	Compressor Auxiliary Relay 38-1T	PWT Relay 38-1T
133154	Compressor Auxiliary Relay 38-2	PWT Relay 38-2
133155	Compressor Auxiliary Relay 25A	PWT Relay 25A
133156	Compressor Auxiliary Relay 25AE	PWT Relay 25AE
133157	Compressor Auxiliary Relay 25AERC	PWT Relay 25AERC
133158	Compressor Auxiliary Relay 25D	PWT Relay 25D
133159	Compressor Auxiliary Relay 76DS	PWT Relay 76DS
133160	Compressor Auxiliary Relay 2TAE	PWT Relay 2TAE
133161	Compressor Auxiliary Relay 2TA	PWT Relay 2TAE
133162	Compressor Auxiliary Relay 2TD	PWT Relay 2TD
133163	Compressor Auxiliary Relay 76DT	PWT Relay 76DT

**Table V: Existing PWT MD Protective Relaying (Continued on next page)**

## 7.1 Appendix A: PWT MD Equipment

Asset ID	Protective Relay Description	Name
133164	Compressor Auxiliary Relay 8D	PWT Relay 8D
133165	Cubicle 52-2C Overcurrent Relay, A phase	PWT 52-2C Rel Aph 50/51
133166	Cubicle 52-2C Overcurrent Relay, B phase	PWT 52-2C Rel Bph 50/51
133167	Cubicle 52-2C Overcurrent Relay, C phase	PWT 52-2C Rel Cph 50/51
133168	Cubicle 52-2C Overcurrent Relay, Neutral	PWT 52-2C Rel 51N
140363	Cubicle 52-2C Overcurrent Relay	PWT 52-2C Rel 51B1A
133172	PWT Unit Substation #1 Undervoltage Relay	PWT US#1 Rel A1-1
140364	PWT Unit Substation #2 Undervoltage Relay	PWT US#2 Rel A1-2
133174	PWT Power Center #3 Undervoltage Relay	PWT US#3 Rel A3

**Table V: Existing PWT MD Protective Relaying (Continued from previous page)**



## 7.2 Appendix B: Reference Drawing List

**Interface Drawings:** These are the principal interface drawings. The Government will provide the Contractor with access to any available relevant drawings in accordance with paragraphs 3.3.2.1b and 3.3.2.1c of this specification.

Motor Foundations: 511-A1, 533-S1.7, 533-S2.4, 533-S3.5, 533-S4.3, 533-S5.1, and 533-S6.1

M1/M2 and M3/M4 Bolted Flange Couplings: 38-A-7563, 38-A-7552, and 38-A-7287

PWT MD motor drive units outline drawing: 60-J-770

Existing FC-1, FC-2, and FC-3 couplings: CS-14627, CS-14944, and CS-14945

Existing M2/M3 motor replacement shaft: 20-02M-01, 20-02M-02, and 20-02M-03

Cooling Water Supply: 511-M08, 38-A-8512

PWT MD Electrical Power Diagram: 59-J-887

PWT MD 161-Kv Sub Station: 521-E12, PYT03623.51, Sketch 2

PWT MD Control Schematic: 44-A-2101 through 2113, and PUF51119

480-V, 3-ph, 60-Hz, Power Centers 1, 2, and 3: 10-1E

125-V DC ungrounded control power: 39-A-9984

Machine Condition Monitoring: PU530668.01 sheets 1 and 2

PWT MD Vicinity Plan View: Sketch 1

### 7.3 Appendix C: PWT MD Raw Cooling Water Analysis

1996 PWT MD Raw Cooling Water Quality Data Summary		Number of Analyses
	mg/l	
BOD	1.7	1
COD	<20	1
TOC	3.3	1
TSS	14.2	20
NH3 (as N) - ammonia	0.2	34
Oil & Grease	<5	1
P - phosphorous	0.06	1
SO4 – sulfate	7.2	1
Al - aluminum	1.8	1
Fe - iron	1.2	20
Mg - magnesium	3.7	1
Mn - manganese	0.02	1
Cd - cadmium	0.0001	34
Cr - chromium	0.003	34
Cu - copper	0.002	34
Pb - lead	0.0014	34

**Table VI: PWT Raw Cooling Water Analysis**

Notes for Table VI:

“BOD” = Biological Oxygen Demand = oxygen reduction of sample over 5 days due to biological activity.

“COD” = Chemical Oxygen Demand = oxygen reduction of sample over 5 days due to chemical reactions.

“TOC” = Total Organic Carbon = amount of organic based carbon.

“TSS” = Total Suspended Solids = amount of material retained on a 0.45 micron filter.

“<” = less than

## **7.4 ATTACHMENT D ASBESTOS REMOVAL**

### **PART 1: GENERAL**

**SPECIFICATION 02080**

1.1 SCOPE: Removal and disposal of asbestos materials.

1.2 CODES AND STANDARDS:

A. AEDC Safety Standards:

1. A9 Hazard Communications, 1996.
2. B5 Confined Spaces, 1997.
3. E7 Asbestos, 1997.
4. E18 Chemical and Petroleum Products Waste Management, 1998.

B. American National Standards Institute (ANSI) Standards:

1. Z9.2-91 Fundamentals Governing the Design and Operation of Local Exhaust Systems.
2. Z88.2-92 Respiratory Protection.

C. American Society of Mechanical Engineers (ASME) Standard:

1. A13.1-96 Scheme for the Identification of Piping Systems.

D. Code of Federal Regulations (CFR):

1. 29 CFR 1910.134 Respiratory Protection, 1999.
2. 29 CFR 1910.1200 Hazard Communication, 1999.
3. 29 CFR 1926.55 Gases, Vapors, Fumes, Dusts, and Mists, 1999.
4. 29 CFR 1926.59 Hazard Communication, 1999.
5. 29 CFR 1926.1101 Asbestos, 1999.
6. 40 CFR 61 National Emission Standards for Hazardous Air Pollutants (NESHAP), 1999.
7. 40 CFR 260 Hazardous Waste Management Systems: General, 1999.
8. 40 CFR 261 Identification and Listing of Hazardous Wastes, 1999.

E. Public Law (PL):

1. 101-637 The Asbestos School Hazard Abatement Reauthorization Act (ASHARA), 1992.

F. Tennessee Department of Environment and Conservation Standard:

1. Chapter 1200-3-11-02 Hazardous Air Contaminants, Asbestos, 1998.

1.3 SUBMITTALS

- A. Evidence satisfactory to the Contracting Officer that the firm removing asbestos has at least one designated employee on site during all abatement activity who has received certification by completing an Asbestos Abatement Contractor Training Course approved or sponsored by the U.S. Environmental Protection Agency (EPA) and who will be responsible for the work whenever any phase of the project is in progress. The course shall be a 5-day supervisory course. A 1-day supervisory refresher course also is acceptable if documents showing completion of the initial 5-day course are submitted and the refresher course or

## **7.4 ATTACHMENT D ASBESTOS REMOVAL**

## **SPECIFICATION 02080**

courses have been completed within the required time frame to maintain currency in EPA certifications. This training shall have been completed within 12 months prior to the bid opening date. Certification shall remain current throughout the course of the job and shall comply with 40 CFR 61 and PL 101-637.

- B. Written certification that all employees involved in the asbestos removal have received training and medical examinations as required by 29 CFR 1926.1101 and 29 CFR 1910.134, respectively. Certification includes respirator fit test records and a copy of respirator operating procedures and program, as specified in 29 CFR 1910.134. Include with the certifications dates of the most recent training, medical examinations, and a physician's statement indicating that workers are physically able to perform asbestos work and use the required respiratory and general body protection. Provide this information for all personnel including management and any air monitoring personnel on the job site before their first entry onto the job site. Keep information current during all phases of the job.
- C. A copy of the hazard communications program and certification that all employees have been trained concerning the hazard communications standards and the written program in accordance with 29 CFR 1910.1200 and/or 29 CFR 1926.59.
- D. A list of products to be used and a Material Safety Data Sheet (MSDS) for each. Products include, but are not limited to, aerosol sprays of any kind, wetting and cleaning agents, fuels, solvents, and paints. MSDS's will be kept in a notebook and will be indexed for easy reference. This MSDS notebook shall remain available to all employees on the job site at all times.
- E. A list of all equipment to be used and manufacturers' literature showing that the equipment and materials meet all EPA, Occupational Safety and Health Administration (OSHA), and ANSI standards for use in asbestos abatement activities. Do not use materials that are or will create hazardous waste as described in 40 CFR 261.
- F. Any citation or notice of violation from any Government agency issued as a result of work performed under this contract or any contract conducted in the last three years. If none have been received, submit a letter certifying that none have been received.
- G. Environmental, health, and safety plan that addresses all environmental, health, and safety aspects of the job. Submit this plan within 30 calendar days after award of the contract and before any field work begins. Include methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing of waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job, including a hazardous waste management plan in accordance with 40 CFR 260, a fire safety plan, and procedures for addressing other emergencies within the work area and in compliance with 29 CFR 1926.55.

## **7.4 ATTACHMENT D ASBESTOS REMOVAL**

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- H. Asbestos removal plan including the precautions to be taken in this work. Do not proceed without the Contracting Officer's written approval of the plan. The plan shall include location of control areas and change rooms; layout of change rooms; location of hot and cold running water shower facilities; types of air machines used; kinds of interface of trades involved in the construction; schedule for sequencing of asbestos-related work; plan for asbestos disposal; type, manufacturer, and name of wetting agent and asbestos sealer to be used; air monitoring; and a detailed description of the pollution control method to be used. The plan shall also state the method proposed to handle oversized asbestos material (too large for bagging). Include dates of proposed work commencement and completion (by phases, if more than one phase is required or proposed).
- I. Air sampling reports are to include the results of daily area and personal air and excursion limit sampling along with negative pressure differential documentation.
- J. Testing Certifications:
  - 1. Evidence that all air sampling is analyzed by a laboratory in full compliance with the OSHA Reference Method and which participates in an inter-laboratory quality assurance program or is accredited by the American Industrial Hygiene Association.
  - 2. Evidence that all persons analyzing samples have successfully completed the required National Institute for Occupational Safety and Health (NIOSH) and EPA-approved courses and been certified proficient by successfully participating in a NIOSH Proficiency Analytical Testing (PAT) (air) or National Institute of Standards and Technology (NIST) program within the last year.
  - 3. Should the contractor choose to collect and analyze bulk samples, submit evidence that the laboratory analyzing asbestos bulk samples is a NIST-accredited laboratory. (Bulk samples may be collected only with the permission of the Contracting Officer and shall be returned to AEDC for disposal.)
- K. Certification that persons monitoring work in confined spaces have successfully completed a course in cardiopulmonary resuscitation (CPR) by the American Red Cross or the American Heart Association.
- L. Evidence that the firm removing asbestos has suitable insurance to cover any asbestos liabilities.
- M. A list of the sampling numbers required by paragraph 3.1B.
- N. AEDC asbestos landfill Operator's Log and Shipper's Log (Form GC-1622). The Government representative will provide this form.
- O. Daily logs.
  - 1. Sign-in logs will be submitted at least monthly and when the job is completed. Sign-in logs will include the following information for all persons entering the controlled area:
    - a. First and last name (must be legible).
    - b. Company and organization.
    - c. Social security number.

- d. Date and time of arrival and departure.
  - e. Reason for visit.
2. Field notes will also be submitted at least monthly and when the job is completed.

#### 1.4 QUALITY ASSURANCE

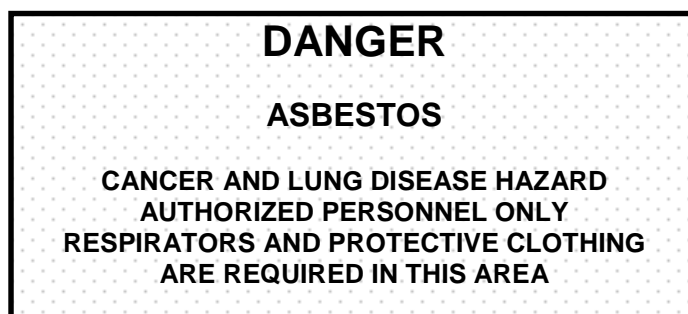
- A. Demolish, remove, and dispose of asbestos materials as indicated on the drawings and specified herein. For the purposes of this specification, full-gross removal containment is required for any removal activity that takes two people over four hours to complete or that is required in 29 CFR 1926.1101. During removal, workers shall not leave the enclosure except for life-threatening emergencies. This applies only to removal activity and not to enclosure construction or final area clean up.
- B. Use glove bag techniques as described in 29 CFR 1926.1101 and paragraph 3.7C, for small sections. If samples taken during initial glove bag work exceed 0.01 fiber per cubic centimeter (f/cc), stop the job and remove all remaining asbestos using full-gross removal containment. Gross removal methods utilizing full decontamination units as described in 29 CFR 1926.1101, Appendix F, shall be the method of removal.
- C. On small sections of pipe, valves, or other small areas of abatement where the glove bag is not suitable and full-gross removal containment is not required mini-enclosures as specified in 29 CFR 1926.1101 may be used. Mini-enclosures shall be equipped with high-efficiency particulate air (HEPA) filtered exhaust ventilation.
- D. Assume unidentified insulating material to be asbestos.

### PART 2 PRODUCTS

- 2.1 AIR RETURN FILTERS: One (1) inch-thick disposable random fiber.
- 2.2 ENCAPSULANTS: Dryable to clear appearance and paintable with standard latex paints (American Coatings Corporation Cable Coating 22P Penetrating Sealant and Lock Down, or approved equal).

### PART 3 EXECUTION

- 3.1 CONTROL OF WORK: Control work locations where the generation of asbestos dust could expose persons not properly protected.
  - A. Use safety ropes and barricades and post with 20-inch by 14-inch signs bearing the following warning:



- B. Record all sampling numbers identified on asbestos material to be removed.
- C. Ensure isolation of the work area or construction of the enclosure complies with 29 CFR 1926.1101. In addition, a continuous layer of true 6-mil polyethylene or other impermeable material shall first be applied to the floor and extend 12 inches up the wall. Use a layer of true 4-mil polyethylene for the first wall and ceiling and extend 12 inches onto the floor. Place the second layer of true 6-mil polyethylene on the floor and extend 18 inches up the wall and follow by the second layer of true 4-mil polyethylene on the walls and ceiling and extend 18 inches onto the floor. Polyethylene used for floors and walls shall be installed in such a manner to prevent ballooning of the polyethylene from the walls or floors. Drop and splatter sheets shall also be used in all containment areas in addition to the use of the two layers of polyethylene on the walls and the three layers on the floors of the containment area. In special situations, such as enclosures constructed outside, you may elect to construct the entire containment out of true 6-mil polyethylene or other impermeable material also supported by plywood or other rigid material. Coordinate such construction with the Government representative. Enclosures constructed to contain asbestos work such as around equipment, utility systems, windows, doors, or other industrial systems shall be constructed of lumber (such as two by fours) or other rigid material supported on centers no greater than forty-eight (48) inches apart and in a manner that shall maintain the integrity of the containment and prevent containment failure and release of asbestos fibers outside the work area. The use of wire, cable and other non-rigid systems shall not be used as containment framework or to otherwise hold polyethylene unless also supported by lumber or other rigid material on no greater than 48-inch centers. Support of polyethylene by wire, cable or other non-rigid materials by themselves shall not be allowed. Polyethylene sheeting shall be attached to the lumber or other rigid material and held in place through the use of spray glue, wooden screen molding nailed or screwed in place, duct tape and/or other mechanical methods.
- D. Construct hygiene facilities for decontamination of workers and equipment in the same way except use true 6-mil polyethylene for walls, ceiling, and floor. Hygiene facilities for decontamination of workers and equipment must be contiguous with the work area in all instances. Construct doors so that flaps completely isolate the rooms in the event of air exhaust ventilation failure and allow easy access for personnel and equipment. The clean room shall be large enough to accommodate at least three workers. Prevent direct viewing into the shower, clean room, or dirty room by other personnel by constructing the walls and ceilings of these areas of black polyethylene.
- E. All negative pressure enclosures shall be smoke tested after initial setup and at the beginning of each work shift.
- F. Ensure that the enclosure walls, floor, and ceiling do not billow or pull out more than 6 inches from the walls or floors to allow for effective cleaning and easy movement of personnel and equipment while inside.
- G. Repair damaged barriers and correct defects as soon as they are discovered. Visually inspect containment barriers at the beginning of each work period. The Government representative may use smoke tube methods to test barrier effectiveness.

## **7.4 ATTACHMENT D ASBESTOS REMOVAL**

## **SPECIFICATION 02080**

- H. Do not commence work until signs are posted, required isolation barriers are erected, and the Contracting Officer or the Government representative has authorized the work to begin. In addition, all equipment such as ladders, scaffolds, HEPA vacuums, air machines, trucks, and other tools and equipment are subject to visual inspection and bulk sampling to ensure that no asbestos debris or contamination is brought onto AEDC from the contractor's previous jobs. Wrap in two layers of true 6-mil polyethylene sheeting or properly bag any items that have visible debris, label ASBESTOS, and remove from AEDC. Encapsulation of items is not sufficient justification to use contaminated equipment. Items that do not pass visual inspection shall not be cleaned at AEDC.
- I. Turn off all building ventilation air systems during preparation and until the area has passed final visual inspection and final air sampling by the Government representative. Remove all heating, ventilation, and air conditioning system filters before commencing asbestos removal and treat them as asbestos contaminated. Seal all air supply and return openings with true 6-mil polyethylene. Replace filters with new ones following the approved inspection.
- J. Clean the work areas of all visible asbestos debris prior to placing polyethylene sheets or beginning asbestos containment work. Establish critical barriers before beginning clean-up work.
- K. Completely decontaminate all ladders, vacuum cleaners, air machines, and other equipment used during abatement activities prior to removal from the abatement area. Cover all such equipment with true 4-mil polyethylene sheeting and duct tape prior to abatement activity. Seal all openings to air machines with true 6-mil polyethylene prior to their removal from an abatement area and any time they are not in operation. Wrap vacuum cleaner hoses with polyethylene. Seal all open ends of vacuum hoses or intake openings of vacuums with duct tape when not in operation to contain the asbestos. Seal ladder rungs, steps, and sides in polyethylene before use in an abatement area to ensure their complete decontamination following abatement. Clean and completely decontaminate all pump-up sprayers, tools, and equipment following abatement. If they cannot be decontaminated, dispose of them as asbestos material in the AEDC asbestos landfill, which is located approximately 2 miles west of the Avenue E and Sixth Street intersection.

### **3.2 RESPIRATORY PROTECTION REQUIREMENTS**

- A. Establish a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.1101. The Government will strictly enforce the OSHA "no facial hair/respiratory policy" for all personnel who wear respirators at any time during the job.
- B. Ensure workers are clean-shaven daily immediately preceding their work shift and before wearing respiratory protection.
- C. Provide spectacle inserts to personnel wearing full-face respirators who normally wear spectacles, otherwise they will not be allowed in the containment area. Do not allow contact lenses to be worn in asbestos areas.

### **3.3 PROTECTIVE EQUIPMENT**



## 7.4 ATTACHMENT D ASBESTOS REMOVAL

## SPECIFICATION 02080

- A. Use protective equipment that meets all Government standards for use in asbestos abatement. Use coveralls having headcovers and booties attached.

### 3.4 LOCAL EXHAUST SYSTEM

- A. Provide a local exhaust system in the asbestos control area in accordance with ANSI Z9.2. Equip exhaust with absolute HEPA (high efficiency particulate air) filters. When possible, HEPA-filtered air shall be exhausted to the outside of buildings. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent unsealed areas and provide a minimum of four complete air changes per hour. Provide continuous 24-hour-per-day monitoring of the pressure differential with an automatic recording instrument. In no case shall the building exhaust system be used as the local exhaust system for the asbestos control area. Filters on vacuums and exhaust equipment shall conform to ANSI Z9.2. Change HEPA filters at least every 700 hours for 12-inch HEPA filters or more often as required to ensure proper filtration of air. Change pre-filters as soon as visible accumulations occur on the filters, and change intermediate filters at least once per shift. If filter loading occurs (i.e., visible accumulations on prefilter), change more often. Conduct air monitoring during asbestos removal to ensure filter integrity and asbestos levels outside the enclosure remain at or below 0.01 f/cc. Provide and install a back up HEPA air exhaust ventilation system to be used in the event of primary system failure. Do not use a system with a remote filter housing inside gross removal areas.

### 3.5 COMMUNICATION DEVICES

- A. Do not use any two-way communication devices unless pre-approved by the AEDC Security Forces.

### 3.6 CONFINED SPACES

- A. Ensure entry into confined spaces is consistent with AEDC Safety Standard B5. Before entering a confined space, make oxygen and Lower Explosive Limit (LEL) measurements using a NIOSH-approved O<sub>2</sub>/LEL metering device. While persons are working in a confined space, designate a stand-by person to remain outside whom the American Red Cross or American Heart Association has trained within the last 12 months in cardiopulmonary resuscitation (CPR).

### 3.7 ASBESTOS REMOVAL

- A. General: Comply with the rules of Tennessee Department of Environment and Conservation, Chapter 1200-3-11-.02, and 40 CFR 61. The Government will notify the Tennessee Air Pollution Control Board (ref 1200-3-11-.02 [2][d]1[ii] and 2). The removal of asbestos insulation from existing piping or other surfaces shall be subject, but not limited, to the following:
  - 1. Require personnel who work with asbestos to use disposable coveralls; disposable head, neck, and shoe coverings; non-porous gloves; eye goggles; and a NIOSH-approved respirator.
  - 2. Saturate all asbestos materials with wetting agent and ensure the material stays damp during removal. Do not allow asbestos insulation to drop to the floor or ground. Place asbestos in a proper container and lower to the floor or ground as appropriate.

3. Protect all existing machinery, equipment, floors, and walls from contamination by asbestos waste.
  4. Control the dispersal of asbestos particles through methods such as isolation and wetting of material before removal. Keep a HEPA-filter vacuum on the job site at all times for use in clean-up of asbestos debris and during glove bag removal.
  5. Do not wear protective clothing off the job site or take home for laundering. Provide a decontamination locker room and a clean locker room for personnel required to wear whole-body special clothing. Keep street clothes in the clean locker. While still wearing respirators in the decontamination room, vacuum and remove asbestos-contaminated disposable protective clothing and seal in impermeable bags or containers for disposal. Locate a shower between the decontamination and clean locker rooms and require all employees to shower before changing into street clothes. Filter shower water to 1 micron prior to disposal in a sanitary sewer.
  6. Do not smoke, eat, drink, chew tobacco or gum, or apply cosmetics at the job site. Ensure that workers are fully decontaminated prior to conducting any of these activities.
- B. Small section removal: Use glove bags to remove asbestos material in small sections with two-person teams specifically trained in glove bag procedures. The Government will enforce strict observance of the glove bag techniques described in 29 CFR 1926.1101 and as specified herein.
1. Place polyethylene under the work area.
  2. Wear full body protection (e.g., coveralls, booties, headcovers, and gloves) in addition to respiratory protection.
  3. Turn off ventilation systems located in the area during asbestos removal.
  4. Clean up and seal ventilation openings in the area.
  5. Establish critical barriers by sealing doors and windows or wall penetrations as necessary.
  6. Do not allow asbestos insulation to drop to the floor or ground.
- C. Glove bag requirements: In areas where insulation has caused contamination under the pipe line, pre-clean the work area of all contamination before applying polyethylene worksheet or conducting any repair or glove bag activity.
1. Use true 6-mil-thick transparent polyethylene glove bags.
  2. Ensure that the diameter of the pipe insulation does not exceed one-third of the bag's working length.
  3. Secure the glove bag with an airtight seal of duct tape. Place duct tape around the pipe insulation first to form a smooth seal.
  4. Conduct a smoke test to ensure that the bag is sealed. A smoke test is conducted by inserting a smoke tube used in ventilation system analysis through the bag. If smoke leaves the bag, the seal is inadequate. In that event, discontinue work until an adequate seal is achieved. Retest the glove bag after each failure.
  5. Wrap any damaged pipe insulation, adjacent to the work area or capable of creating asbestos fallout as a result of glove bagging, in at least true 6-mil-

thick plastic sheeting and seal tight with duct tape, or seal and repair with insulation mastic. In areas where insulation to be removed has deteriorated and the temporary repair may create a potential fiber release, use HEPA local exhaust ventilation during repair or removal.

6. Saturate all asbestos-containing materials within the glove bag with amended water prior to stripping. When using pump-up sprayers for wetting agents and encapsulants, place the spray wand through the side of the bag and seal holes prior to the start of asbestos removal.
7. Saturate the pipe with amended water after the insulation has been stripped and scrub with a brush to remove all visible asbestos material.
8. Seal any piping insulation ends created by the repair with an EPA-approved encapsulant and an insulating mastic.
9. Use a HEPA vacuum to collapse the glove bag. Seal the vacuum in the glove bag prior to asbestos removal and run continuously during shifting of glove bag.
10. Use negative pressure enclosure with HEPA local exhaust ventilation in areas where removal of badly deteriorated insulation is to occur, regardless of the amount of asbestos to be removed.
11. Double-bag the glove bag and all other asbestos-containing waste for disposal.

**D. Floor tile removal requirements:**

1. Post warning signs at the entrance to the renovation area.
2. Shut off the building HVAC system during tile removal and subsequent clean up. Seal ductwork openings with polyethylene sheeting as required in paragraph 3.11. Establish critical barriers to the work area by sealing doors, windows, and any wall penetration.
3. Conduct no other construction work in the renovation area while removing asbestos tile or during the clean up of removed tile.
4. Pre-clean the floor tile to be removed of all visible construction debris and dust. This pre-cleaning is not considered asbestos removal unless damaged floor tile is removed during the process.
5. Seal all holes, floor penetrations, and utility tracks found in the floor to prevent asbestos contamination by tile, mastic, or contaminated water.
6. Cover the walls of the floor tile removal area with one layer of true 4-mil polyethylene to a height of 4 feet. Do not damage wall coverings during this process.
7. Remove floor tiles using methods that will not create any visible dust. The preferred method is to wet the floor, cover it with polyethylene, and let the floor remain wet overnight or longer. The water under the plastic should loosen the glue allowing easy dust-free removal of the tile. Use a hand sprayer to mist tiles as they are being removed to further reduce dust. Remove glue that might remain on the floor using a method that does not create dust. If a sanding method is used, it shall be done under wet conditions. Use a HEPA-filtered vacuum to remove any residue left on the floor by wet methods.

8. Dispose of floor tiles, residue, mops, and rags as asbestos-containing materials in the asbestos landfill. Ensure any solvents used for mastic removal do not result in a residue that is considered to be a hazardous waste as defined by the EPA. Do not place solvents in the AEDC asbestos landfill in a free-liquid state. Dispose of all asbestos-contaminated or asbestos-containing materials in two true 6-mil polyethylene bags especially designed for asbestos disposal. If the floor is mopped with water, treat mop water as asbestos-contaminated, solidify, and place in metal drums. Rinse water used to clean asbestos mastic from surfaces shall not be disposed of in the sanitary sewer system. Do not overload bags to the point that they might rupture. Pack asbestos waste containing sharp ends in a manner that will prevent any puncture of bags. Bagged asbestos floor tile or linoleum shall be disposed of in airtight metal drums. When using metal drums, ensure they meet the requirements of paragraph 3.10D. Transport waste to the asbestos landfill in a covered truck.
  9. When the odor of solvents used for mastic removal is detected in areas adjacent to removal area, ventilate the removal area using a HEPA-filtered air exhaust system until such odors are no longer detected. While this is occurring, stop all solvent use and general removal until odors are no longer detected in adjacent areas.
  10. Monitor area, personnel, and clearance air in accordance with OSHA and EPA guidelines (see paragraph 3.8) during floor tile removal and document asbestos fiber concentrations.
  11. The Government representative will visually inspect the area prior to job completion. Remove all tile and glue residue from floors prior to inspection. The floor shall be considered clean when mastic and floor tile on all surfaces of the floor have been removed. Clean cracks and holes, 1/16-inch or larger in width or diameter, of all mastic that may be removed using solvents, common utility knife, brushes, and HEPA vacuum without damaging the floor by chipping. Cracks and holes smaller than 1/16-inch shall be considered clean if their surfaces have been cleaned of mastics using solvents, brushes, and HEPA vacuum and shall generally be treated the same as non-cracked surfaces.
  12. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.
- E. Window glazing requirements: Remove windows containing only asbestos glazing compounds by doing the following in addition to the requirements of other applicable sections of this specification.
1. Establish critical barriers to the general work area by sealing doors, wall penetrations, and ductwork vents as appropriate.
  2. Post the asbestos warning signs.
  3. Using duct tape and polyethylene, seal all exposed asbestos materials to prevent fiber release during window removal.
  4. Pre-clean the windows, seals, floor, and ground as necessary to remove asbestos contamination located in these areas. Outside, clean the ground a distance of approximately 3 feet from the building and 2 feet to the left and

right of each set of windows to remove ground contamination. Remove visible debris only.

5. Remove the windows with care. Wrap each in two layers of 6-mil polyethylene, label as asbestos, and dispose of in the asbestos landfill as described in paragraph 3.10.
  6. Protect all existing finishes, furniture, and fixtures.
  7. Coordinate the window removal with the window replacement.
  8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.
- F. Window caulking requirements: Remove windows containing asbestos caulking compounds by doing the following in addition to the requirements of other applicable sections of this specification.
1. Establish critical barriers to the general work area by sealing doors, wall penetrations, and ductwork vents as appropriate.
  2. Post the asbestos warning signs.
  3. Pre-clean the windows, sills, floors, and ground as necessary to remove asbestos contamination located in these areas. Outside, clean the ground a distance of approximately 3 feet from the building and 2 feet to the left and right of each set of windows to remove contamination. Remove visible debris only.
  4. Construct mini enclosures on the inside and outside of the windows and exhaust to the outside using HEPA filtration machines.
  5. If asbestos glazing compounds are present, seal all exposed asbestos materials to prevent fiber release. Remove caulking compounds using wet methods and HEPA-filtered vacuums. Clean windows of all caulking materials or dispose of the entire window in the asbestos landfill as described in paragraph 3.10.
  6. Protect all existing finishes, furniture, and fixtures.
  7. Coordinate the window removal with the window replacement.
  8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.
- G. Ventilation ductwork removal requirements: Remove ventilation ductwork, which is insulated with a non-asbestos material held in place by asbestos-containing glue or mastic, by doing the following in addition to the requirements of other applicable sections of this specification and 29 CFR 1926.1101.
1. Establish critical barriers to the general work area by sealing doors, windows, wall penetrations, and ductwork vents as appropriate.
  2. Post the asbestos warning signs.
  3. Place a true 6-mil polyethylene worksheet under the work area.
  4. Carefully wet the insulation mastic and the wrap the ductwork with one layer of true 6-mil polyethylene.
  5. When cutting a duct in sections, strip insulation and mastic from the area of the cut using wet methods and seal the edges of the insulation and mastic before cutting. Take care to prevent mastic fallout from the duct due to vibration caused by cutting.

## **7.4 ATTACHMENT D ASBESTOS REMOVAL**

## **SPECIFICATION 02080**

6. After removing the duct from the ceiling area, wrap the duct with a second layer of true 6-mil polyethylene and label for disposal.
  7. Clean any mastic residue remaining on the floor, roof deck, duct hangers, or ceiling frames.
  8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.
- 3.8 AIR MONITORING: Monitor airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101 and as specified below:
- A. Monitoring during asbestos work: Provide personnel and area monitoring and establish an 8-hour time-weighted average and 30-minute excursion level concentration during the first exposure to airborne asbestos to document exposure levels and determine respiratory protection requirements. Thereafter, when the same type of work is being performed, provide area monitoring once per work shift inside the asbestos control area, outside the entrance to the asbestos control area, and at the exhaust opening of the local exhaust system. Due to other areas of the building being occupied during asbestos removal, collect samples from all sides of the work area to verify air quality outside the containment. This includes sampling on the second floor above the asbestos work area. Sampling shall be done each shift. If monitoring outside the asbestos control area shows airborne concentrations above 0.01 f/cc, stop all work, notify the Government representative immediately, and correct the condition causing the increase. Provide results of sampling to the Contracting Officer as soon as possible following collection of the sample. A primary calibration standard is the standard of choice. However, a secondary standard may be used if a calibration curve for that standard is on-site in the field with the secondary standard and the curve compared to a primary standard within 3 months of the sample collection date. Conduct air sampling following the current OSHA Sampling Reference Method, which includes field calibration of sample pumps immediately before and after air sampling.
  - B. Monitoring after final clean-up: Provide area monitoring of asbestos fibers and establish a quality level of less than 0.01 f/cc after final clean-up but before removing the enclosure of the asbestos control area. If any of the final samplings indicates a higher value, take appropriate action to re-clean the area and repeat the monitoring. Provide sample results to the Contracting Officer prior to removal of any enclosures or barriers.
  - C. Provide the results of all air samples as soon as possible following collection and analysis. Include the location of their collection (for example, area [where], personnel [who]), sample number, start and stop times, dates of collection, duration of sampling, flow rate in liters per minute, sample volume, total fiber count, detection limit of the analysis and airborne fiber concentration in fibers per cubic centimeter of air, name of the laboratory, and name of the person analyzing the samples. Make field notes used at the job site during sample collection available at any time to the Government representative upon request.
  - D. If bulk samples are analyzed, use a laboratory accredited by NIST. A laboratory that is in full compliance with the OSHA Reference Method and participates in the required inter-laboratory quality assurance program shall analyze air samples. Any persons analyzing these samples shall have attended the

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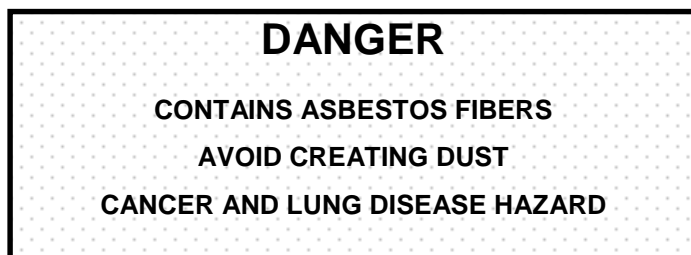
required NIOSH- and EPA-approved courses and shall have been determined proficient by successful participation in a NIOSH-PAT (air) or NIST program within the last year. This proficiency shall remain current throughout the course of the project. Return bulk samples to AEDC for disposal.

### 3.9 VENTILATION

- A. In a non-gross removal area, ventilate the local areas with a HEPA-filtered air exhaust ventilation system during clean-up of areas greater than 400 square feet or when gross asbestos contamination presents such a hazard to warrant the use of a HEPA local exhaust system to control the hazard. See paragraph 3.1K for clean up in a gross removal area.

### 3.10 DISPOSAL

- A. Seal asbestos-contaminated material, disposable coveralls, disposable protective equipment, polyethylene, wood, and all other material used for enclosures and scrap in a clear true 6-mil sealed impermeable bag. HEPA vacuum all trapped air from each disposal bag before sealing and place in another true 6-mil, labeled, sealed, impermeable bag. Bags filled or rebagged at the asbestos landfill do not have to be HEPA vacuumed (see subparagraph C). Label the outer bag with the following warning:



- B. Capture water and fluids used in wet method control and cleaning, and place in labeled, sealed impermeable containers. Label the containers with the same warning required in paragraph 3.10A. Filter water through 1-micron filters before allowing water to pass to a sanitary sewer. Do not place free liquids in the AEDC asbestos landfill.
- C. Dispose of all asbestos waste in the AEDC asbestos landfill. Coordinate times of delivery with the Government representative (normally from 7 AM to 1 PM, Monday through Friday). When landfill conditions preclude adequate covering of asbestos, disposal will not be permitted. The Government representative will make this determination. These conditions will include, but are not limited to, excessive moisture in the landfill caused by the weather. When this condition occurs, the asbestos will be stored at AEDC at the contractor's expense until the Government grants disposal authority. Do not dispose of asbestos material in any area other than the asbestos landfill. Remove and dispose of all asbestos dust particles and waste generated during each work period at the end of each work period. Place bagged waste not taken to the landfill at the end of the shift in secure areas, such as a locked panel truck, prepared for disposal as indicated in paragraph 3.11.

- D. Place asbestos materials, which contain sharp edges or are too heavy to be placed in true 6-mil polyethylene bags, in clean, new, or reconditioned, practically air-tight metal drums. Reconditioned drums are drums that have been emptied as specified in 40 CFR 261 and repainted inside and out.
- E. Do not place any hazardous waste, as defined in 40 CFR 261, in any AEDC landfill. Where hazardous waste is generated or removed, follow the procedures given in AEDC Safety Standard E18. Coordinate with the Government representative in completing forms GC-565 and GC-1337.
- F. All users of the asbestos landfill are required to obtain an AEDC Disposal Permit. (Refer to AEDC Safety Standard E7 for permitting procedure and permit requirements.)
- G. Complete Form GC-1622, AEDC Asbestos Landfill Operators Log and Shipper's Log, for each load of asbestos waste. The Government representative will provide form GC-1622.
- H. Only properly containerized, labeled, and adequately wet asbestos accompanied by a completed Form GC-1622 and an AEDC Disposal Permit shall be transported to or disposed of in the asbestos landfill.

### 3.11 TRANSPORTATION

- A. Transport properly bagged and identified asbestos waste in a metal panel truck or trailer which is prepared as follows:
  - 1. Bed lined with three layers of true 6-mil polyethylene which overlap walls by at least 12 inches; line the walls with two layers of true 4-mil polyethylene; and line the doors to the enclosed bed lined with two layers of true 4-mil polyethylene.
  - 2. Seal the truck or trailer to prevent any water or contamination leakage.
  - 3. Equip the doors to the lined enclosure with a security lock.
- B. The truck or trailer will be inspected by the Government representative before asbestos is loaded and after disposal.
- C. When transporting asbestos on the open highway, follow current Department of Transportation regulations.

### 3.12 SEALING

- A. Reseal any asbestos material that is not in the job scope for removal but is exposed as part of this work. Seal with a Government-approved bridging encapsulant and insulation mastic to contain and prevent future damage of the asbestos. If outside, ensure material used will withstand weathering.

### 3.13 SAFETY

- A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to personnel and damage to existing equipment and structures. Minimize the generation and spread of dust and flying particles.

### 3.14 HAZARD COMMUNICATIONS

- A. Maintain and implement a written Hazard Communications Program as required by 29 CFR 1910.1200 and AEDC Safety Standard A9. Ensure all employees



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and anyone else involved with the abatement job are familiar with the program and its location. Ensure all other requirements outlined in AEDC Safety Standard A9 are met.

### **3.15 UTILITIES**

- A. Do not interrupt existing utilities or commence power outages without written permission from the Contracting Officer or the Government representative. Obtain an AF Form 103, BCE Work Clearance, from the Government representative prior to interrupting utilities. Do not remove asbestos from active steam or electrical lines. Wait for appropriate utility outages. Provide backflow prevention devices as required to prevent cross-contamination of water supplies.

### **3.16 GENERAL CLEAN-UP**

- A. Remove dust, dirt, and debris caused by demolition operations from adjacent structures and improvements. Return adjacent areas to their condition prior to the start of the work.

### **3.17 LABELING**

- A. Stencil new and replaced insulation with the word "NON-ASBESTOS," in accordance with ANSI A13.1, at the edges of replaced sections. Indicate the direction of replacement with arrows using a 1-inch stripe to indicate the boundaries. Place the word "NON-ASBESTOS" at intervals not exceeding 25 feet using a highly visible paint.
- B. Place labels identifying piping systems (e.g., 30 lb. steam, raw water, heated potable water) as appropriate for newly insulated piping systems.

### **3.18 DEBRIS DISPOSAL**

- A. Transport debris, rubbish, waste, and other non-asbestos materials resulting from demolition from the site to the construction landfill which is located approximately 2 miles west of the Avenue E and Sixth Street intersection. Do not place edibles or garbage in the construction landfill; use existing dumpster boxes.
- B. Dispose of all material contaminated by asbestos in the asbestos landfill as described in paragraph 3.10.

### **3.19 VISUAL INSPECTIONS**

- A. Visually inspect the work area after pre-cleaning and before placing any polyethylene sheeting. Re-clean and inspect any area where cleaning has not been adequately done before placing polyethylene sheeting. Inspect polyethylene enclosures for adequacy prior to removing any asbestos. Do not start abatement procedures prior to release by a Government industrial hygienist who will visually inspect the area for cleanliness and enclosure adequacy.
- B. Assist in the visual inspection of all areas (enclosure areas cleaned, disposal bags, drums, trucks, and equipment used in asbestos removal) as requested by the Government representative. Include the opening of drums and bags or any other inspection activity.

**3.20 ASBESTOS ABATEMENT COMPLETION**

- A. Do not remove protective barricades or enclosures until the Government representative concurs in writing. The Government may conduct independent, aggressive air monitoring at the conclusion of the removal operation to determine air quality. A reading of not more than 0.01 f/cc of air is required before barricades and enclosures shall be removed. The Government representative will visually inspect the affected surfaces for residual asbestos material and accumulated dust, and the contractor shall re-clean all areas showing dust or residual asbestos materials. If re-cleaning is required, monitor the airborne asbestos concentrations after re-cleaning. Remove the decontamination facility from the area following the final visual inspection and upon concurrence by the Government representative. Encapsulate interior of polyethylene walls, ceiling, floor, pipe surfaces, and other surfaces where asbestos has been removed following visual inspection. Keep the area sealed, barriers intact, and air ventilation with a HEPA-filtered exhaust in operation until the results of final air samples are received. The Government representative will visually inspect the general work area following enclosure or barrier removal to ensure the work area has been adequately cleaned and to ensure that no damage has been done to buildings or equipment.

**PART 1 GENERAL**

1.1 SCOPE: Removal and disposal of lead containing materials and materials containing other heavy metals (barium, cadmium, silver, mercury, and chromium).

1.2 CODES AND STANDARDS

A. AEDC Safety Standards:

1. A6 User and Subcontractor Safety, 1996.
2. A9 Hazard Communication, 1996
3. B1 Work Clearances, 1998.
4. E17 Oil and Hazardous Substances Spill Response, 1998.
5. E18 Chemical and Petroleum Products Waste Management, 1998.
6. E19 Lead and Heavy Metals, 1997.

B. American National Standards Institute (ANSI) Standards:

1. Z9.2-91 Fundamentals Governing the Design and Operation of Local Exhaust Systems.
2. Z88.2-92 Practices for Respiratory Protection.

C. Code of Federal Regulations (CFR):

1. 29 CFR 1910.134 Respiratory Protection, 1999.
2. 29 CFR 1910.1200 Hazard Communication, 1999.
3. 29 CFR 1926.55 Gases, Vapors, Fumes, Ducts, and Mists, 1999.
4. 29 CFR 1926.57 Ventilation, 1999.
5. 29 CFR 1926.62 Lead Standard, 1999.
6. 40 CFR 260 Hazardous Waste Management Systems: General, 1999.
8. 40 CFR 261 Identification and Listing of Hazardous Waste, 1999.
9. 40 CFR 262 Generators of Hazardous Waste, 1999.
10. 49 CFR 172 Department of Transportation (DOT) Regulations for Use of Hazardous Materials Tables and for Communication, 2000.
11. 49 CFR 178 DOT Specifications for Packaging, 2000.

D. Environmental Protection Agency (EPA) Document:

1. SW-846 Proposed Sampling and Analytical Methodologies for Additions to Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 1984.

E. Steel Structures Painting Council (SSPC) Standard:

1. Guide 7-95 Guide for the Disposal of Lead-Contaminated Surface Preparation Debris.

**F. Public Law 102-550:****1. Title X**

Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992.

**G. Underwriters Laboratories, Inc. (UL) Standard:****1. 586-99**

Safety High-Efficiency, Particulate, Air Filter Units.

**1.3 DEFINITIONS**

- A. Action level: Employee exposure, without regard to use of respirators, to an airborne concentration of lead of  $30 \mu\text{g}/\text{m}^3$  averaged over an 8-hour period. As used in this section, " $30 \mu\text{g}/\text{m}^3$ " refers to the action level.
- B. Area monitoring: Sampling of lead concentrations within the lead-control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.
- C. Change rooms and shower facilities: Rooms within the designated physical boundary around the lead-control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

- D. Clearance level: Prior to the moving or removal of enclosures used for lead abatement, air samples will be taken by the Government representative to ensure that airborne levels of lead are at or below  $3 \mu\text{g}/\text{m}^3$ . In addition, a detailed visual inspection will be conducted by the Government representative for all surfaces and equipment in the containment or control area. Surfaces include any portion of the containment including walls, ceilings, and floors, scaffolds, and any equipment or objects that are present in the containment or that have been used in the containment. The inspection will be conducted by wiping a clean cloth across all surfaces and inspecting the cloth for evidence of any dust. If any dust is found on the cloth, the contractor shall re-clean the entire containment until a detailed inspection is passed. All dust will be assumed to be lead- or heavy metal contaminated. When enclosures are not required, inspection of the work area will be conducted to ensure adequate decontamination of the area. This method will be used before moving or removing containments or enclosures. Before containments are removed from AEDC, wipe and/or microvac samples will be collected from representative surfaces to determine if the containments have been cleaned to a level of  $500 \mu\text{g} / \text{ft}^2$  or less. If any one sample exceeds  $500 \mu\text{g} / \text{ft}^2$ , then the entire containment shall be re-cleaned.
- E. Decontamination room: Room designated for removal of contaminated personal protective equipment (PPE).
- F. Designated lead-abatement supervisor: A person who has attended any 3- to 5-day lead-abatement course taught in the United States. The person shall be knowledgeable of Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and other Government regulations.
- G. Eight-hour time weighted average (TWA): Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.
- H. Grit blasting: Remove paint with recyclable steel grit or recyclable steel grit embedded in a synthetic open-cell polymer sponge.
- I. High-efficiency particulate air (HEPA) filter equipment: HEPA-filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high-efficiency particulate filter means it is 99.97 percent efficient against 0.3-micron-size particles. This equipment may be containment exhaust systems or hand held paint removal equipment such as peeners, needle-guns, grinders, or sanders.
- J. Lead: Metallic lead, inorganic lead compounds, and organic lead soaps.
- K. Lead-control area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint-removal operations. The lead-control area is isolated by physical boundaries to prevent unauthorized entry of personnel.
- L. Lead permissible exposure limit (PEL): Fifty (50)  $\mu\text{g}/\text{m}^3$  as an 8-hour TWA as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a workday, the PEL shall be determined by the following formula:  $\text{PEL} (\mu\text{g lead}/\text{m}^3) = 400/\text{No. hrs. worked per day}$ .

## 7.5 ATTACHMENT E LEAD REMOVAL

## SPECIFICATION 02085

- M. Microvac: Alternate sampling method for surfaces that are not conducive to wipe sampling. Sampling is conducted using a 37mm air-sampling cassette with 0.8 micron filters at a flow rate of approximately 4 liters per minute. Samples are vacuumed from a six (6) in.<sup>2</sup> area unless conditions require a smaller or larger sample area. Results will be reported in µg /ft<sup>2</sup>.
- N. µg/m<sup>3</sup>: Micrograms per cubic meter of air (refers only to lead in this document).
- O. µg /ft<sup>2</sup>: Micrograms per square foot of surface (refers only to lead in this document).
- P. Personal monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour TWA concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.
- Q. Physical boundary: Area physically roped or partitioned around an enclosed lead-control area or area where HEPA filtered hand or power tools are used or chemical paint removal is being conducted. The barriers are placed to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead-control area but within the roped-off area." In areas where enclosures are not used, this is the area where lead abatement work is being conducted.

### 1.4 SUBMITTALS

- A. Evidence satisfactory to the Contracting Officer that the firm performing lead abatement has at least one designated employee on site during all abatement activity who has attended a lead-abatement course taught in the United States and who is knowledgeable in all aspects of lead abatement. Show this by course certification and description of past lead-abatement experience that includes a list of previous clients and a resume. Have physically on each individual job site at least one such designated supervisor directly responsible for the work whenever any phase of the project is in progress. Multiple enclosures being worked at the same time shall require individual lead-abatement supervisors responsible for each enclosure.
- B. Written certification that all employees involved in lead abatement have received training and medical examinations as required by 29 CFR 1926.62. Certification includes respirator fit-test and training records and a copy of the respiratory protection program. Include with the certifications, dates of the most recent training, medical examinations, and a physician's statement indicating that workers are physically able to perform lead-abatement work and use the required respiratory and general body protection. Provide this information for all personnel including management and any air-monitoring personnel on the job site before their first entry within the job site. Training shall be accomplished prior to the time of initial job assignment. Keep the job information current for all employees during all phases of the job.

- C. Any citation or notice of violation from any Government agency issued as a result of work performed under this contract or any contract engaged in during the last 3 years. Submit a brief explanation of any cited incident. If none have been received, submit certification to that effect.
- D. Environmental, health, and safety plan that addresses all environmental, health, and safety aspects of the job. Submit this plan within 30 calendar days after award of the contract and before any field work begins. The plan shall include the following information:
  - 1. Identification of hazardous waste associated with the work.
  - 2. Estimated quantities of wastes and/or hazardous wastes to be generated and disposed of.
  - 3. Names and qualifications (experience and training) of personnel who will be working on site with hazardous waste.
  - 4. List of the waste-handling equipment to be used in performing the work, to include cleaning, volume-reduction, and transport equipment.
  - 5. Spill prevention, containment, and clean-up contingency measures to be implemented. Reference AEDC Safety Standard E17.
  - 6. Work plan and schedule for waste containment, removal, and disposal. Waste shall be cleaned up and containerized daily.
  - 7. Methods to control fugitive air emissions.
  - 8. Methods to control employee exposure to lead during removal.
  - 9. Methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job. The plan shall also include fire safety plan and procedures for addressing other work area emergencies in compliance with 29 CFR 1926.55, and a hazardous waste management plan in accordance with 40 CFR 260 and with applicable requirements of federal and local hazardous waste regulations.
- E. A copy of the hazard communications program and certification that all employees have been trained concerning the hazard communications standards and the written program in accordance with 29 CFR 1910.1200 and AEDC Safety Standard A9.
- F. A list of products to be used and a Material Safety Data Sheet (MSDS) for each. Products include, but are not limited to, aerosol sprays of any kind, wetting and cleaning agents, fuels, solvents, paints, etc. MSDS's shall be kept in a notebook and indexed for easy reference. This MSDS notebook shall remain available to all employees on the job site at all times.

- G. A detailed job-specific plan of the work procedures to be used in the removal of lead paint. The plan shall include a sketch showing the locations, size, and details of lead-control areas and the location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation systems. Include eating, drinking, smoking, and restroom procedures; interface of trades; sequencing of lead-related work; collected wastewater (to include shower water) and paint debris disposal plan; air sampling plan; respirators; protective equipment; and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of  $3 \mu\text{g}/\text{m}^3$  are not exceeded outside the lead-control area. Include air sampling, training, strategy, sampling methodology, frequency, duration of sampling, and qualifications of air-monitoring personnel in the air-sampling portion of the plan. Obtain approval of the plan prior to the start of paint-removal work.
- H. Air and substrate sampling reports.
- I. Testing laboratory qualifications including the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne and substrate concentrations of lead. The laboratory shall be one that is accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/re-accreditation. Samples collected to determine if materials are hazardous waste shall be analyzed by a laboratory qualified to conduct such analysis following Environmental Protection Agency Document SW-846. Provide split samples of any materials or media to the Government as requested for Government analysis.
- J. Air-monitoring results submitted within 24 hours following the monitoring, signed by the person performing the air monitoring, the employee who analyzed the sample, and the designated site superintendent responsible for the lead-abatement operation. See paragraph 3.2.B.3 for additional information.
- K. A list of all equipment, including water, air filters, and respirators to be used, and manufacturer's literature showing that the equipment and material meet all EPA, OSHA, and ANSI standards for use in lead-abatement activities. Include certification that vacuum- and air-filtration devices are filtered with HEPA filters. Include operating instruction for paint-removal equipment.
- L. Equipment rental notifications (see paragraph 1.5C).
- M. Shower water sample test results.



**1.5 EQUIPMENT**

- A. Respiratory protection requirements: Establish a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.62. The Government will strictly enforce the OSHA "no facial hair/respiratory policy" for all personnel who wear respirators at any time during the job.
  - 1. Ensure workers are clean shaven daily immediately preceding their work shift and before wearing respiratory protection.
  - 2. Provide spectacle inserts to personnel wearing full-face respirators who normally wear spectacles; otherwise, spectacles shall not be worn in lead-abatement areas.
- B. Special protective clothing: Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole-body clothing, head coverings, gloves, and foot coverings. Use coveralls having head covers and booties attached. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining concurrence from the Government representative.
- C. Rental equipment notification: If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer (see paragraph 1.4L).
- D. Vacuum and negative air machine filters: UL 586-labeled HEPA filters.
- E. Decontamination: Completely decontaminate all ladders, vacuum cleaners, air machines, and other equipment used during abatement activities prior to removal from the abatement area. If they cannot be decontaminated, then dispose of them as hazardous waste.
- F. Condition: Clean all equipment used at non-AEDC job sites prior to arrival at AEDC. Any contaminated equipment identified during inspection of incoming vehicles shall be removed from AEDC until cleaned. Any such equipment shall not be cleaned at AEDC. Do not remove any equipment used at AEDC that has not been decontaminated and inspected by the Government representative. All equipment and other articles are subject to inspection by Government representatives upon arrival or exit from AEDC. The Government will impound contaminated equipment identified on out-going vehicles until the contractor conducts adequate decontamination procedures.

**PART 2 PRODUCTS****2.1 ABRASIVE MATERIALS (If applicable)**

- A. Abrasive blasting materials shall meet the requirements as specified in the paint schedule under "Surface Preparation."
- B. Limits on the composition of abrasive materials: The soluble metal content and the total metal content shall not exceed values which would cause a material to be classified as a hazardous waste as defined in 40 CFR 261.

**3.1 PROTECTION**

A. Notification: Notify the Government representative 30 days prior to the start of any paint-removal work.

B. Lead-control area requirements:

1. Establish a lead-control area by completely enclosing the area or structure where lead-containing paint-removal operations are to be performed or isolate using barrier ropes and signs if containment is not required.
2. When enclosures are not required, place polyethylene sheeting on the ground or floor of the work area and out from the building a distance of at least twenty feet. Cover non-moveable objects with protective covering such as polyethylene. Close and tightly lock doors and windows when working near doors or windows. Protect brick and walls from contamination and remove prior dust and debris by HEPA vacuum and wet wiping. If doors and windows will not tightly close, seal with polyethylene from the inside of the building. If storm windows must be removed to allow repainting of windows, wet wipe and HEPA vacuum the entire storm window (both sides) to remove any lead contamination.
3. When building occupants are allowed to remain in the premises provide a safe, lead free access to and from the building during the work and at the end of the day. Provide adequate security to the work area and equipment to prevent any hazard to the area occupants.
4. Contain removal operations by the use of a negative-pressure full-containment system. Also see paragraph 3.1.1.
5. Enclosures used to control lead emissions shall consist of the lead-abatement work area, and a decontamination unit for personnel, consisting of a dirty equipment room, a shower equipped with hot and cold running water, and a clean change room for workers. A separate decontamination chamber shall be constructed for equipment decontamination and the safe passage of hazardous wastes from the work area to the outside. Removal of contaminated dust-collecting filters from the recycling abrasive blasting and vacuuming machines shall be accomplished in a manner to prevent the contaminated dust from entering the environment. All personnel assigned to changing filters and cleaning the machinery shall be fully clothed with approved protective clothing and equipment. The clean room shall be equipped with lockers where clean respirators and street clothes are stored. No contaminated articles shall enter the clean room. Contaminated articles shall remain in the work area until cleaned or disposed of as hazardous waste. The decontamination units shall be constructed contiguous to the work area (enclosure), and the shower shall be constructed in a manner that requires the worker to pass from the dirty room through the shower stall into the clean room.
6. Filter shower water through a 1-micron filter or other filter system that will result in equivalent water filtration. Collect water and sample to determine if lead levels in the water are below 100-ppb if tested by a qualified laboratory or 50-ppb if tested by an approved field kit. If levels are below these

concentrations, then the water may be discharged into the sanitary sewer. All water shall be collected and sampled before discharge using either a field measuring kit as described below or the results from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. The Government representative may collect and test duplicate samples to ensure the integrity of the qualified laboratory performing the analysis. Field analysis conducted using portable test kits will be approved by the Government industrial hygienist prior to use. Colorimetric test kits such as CHEMetrics, Inc., Cat. No. K-8350, are such kits. Any water tested using field kits that indicates lead levels above 50-ppb shall be re-filtered and re-tested until field measurements are below 50 ppb or the water has been found to be less than 100-ppb using laboratory testing from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. If field analysis is used, a Government representative will be present during all testing and field analysis. The holding tank used for the collection of contaminated water will be locked and unlocked by the Government representative to prevent the release of contaminated water to the environment before adequate filtering. The contractor shall provide the means of locking the tank; however, the Government representative will provide the lock.

7. Enclosures used for lead abatement shall be constructed of materials strong enough to withstand environmental elements (i.e., wind, rain, and snow) when outside. The containment shall comply with a Class 1 containment system as described in SSPC Guide 7 (CON). The containment shall be made of impermeable walls with rigid or flexible framing, fully sealed joints, airlock entryways, and HEPA-filtered negative air achieved by forced airflow (verified by instrument monitoring). Airflow in the containment shall be maintained at a pressure differential of minus 0.02 inch of water. Airflow in the containment shall be maintained at a minimum of 100 ft/min for the cross draft ventilation and at least 60 ft/min for the down draft ventilation. Construct hygiene facilities for decontamination of workers and equipment similar to the main containment. Construct doors with flaps that completely isolate the enclosure in the event of air exhaust failure and allow easy access for personnel and equipment. The clean room shall be large enough to accommodate at least three workers at any one time. Prevent direct viewing into the shower, clean room, or dirty room by other personnel by constructing the walls and ceiling of these areas of black polyethylene or similar material. Provide detailed specifications, drawings, and load calculations of containment structure for 100 percent containment of lead emissions, grit, and dust. If the containment is to be used for abrasive blasting, blast shields shall be used to protect the outside walls of the containment from damage by blast media.
- C. Protection of existing work to remain: Perform paint removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

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- D. Boundary requirements: Provide physical boundaries around the lead-control area by roping off the area. Ensure that airborne concentrations of lead will not exceed  $3 \mu\text{g}/\text{m}^3$  outside the lead-control area or enclosure.
- E. Change room and shower facilities: Provide clean change rooms and shower facilities within the physical boundary around the designated lead-control area in accordance with requirements of 29 CFR 1926.62 and as outlined in paragraph 3.1.
- F. Mechanical ventilation system:
  - 1. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
  - 2. Local exhaust system: Provide a local exhaust system in the lead-abatement area (enclosure) in accordance with ANSI Z9.2. Equip exhaust with absolute HEPA filters. HEPA-filtered air will be exhausted to the outside of buildings when work is conducted inside buildings. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent unsealed areas. Provide continuous 24-hour-per-day monitoring of the pressure differential with an automatic recording instrument. Filters on vacuums and exhaust equipment shall conform to ANSI Z9.2. Change pre-filters and HEPA filters often enough to ensure that lead concentrations at the exhaust are at or below  $3 \mu\text{g}/\text{m}^3$ . Provide and install a back up HEPA air-exhaust ventilation system to be used in the event of primary system failure. Do not use a system with a remote filter housing inside the lead-removal area.
- G. Personnel protection: Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, and/or drinking are not permitted in the lead-control area. No one shall be permitted in the lead-control area unless they have received appropriate training and protective equipment.
- H. Warning signs: Provide warning signs at approaches to lead-control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.
- I. During building renovations where abrasive blasting is not used and paint must be removed by other means, such as HEPA-shrouded mechanical removal equipment, critical barriers and polyethylene enclosures may be used. The requirement for showers and HEPA negative pressure exhaust shall be dependent on air concentrations. If air concentrations are below the action level for lead, then showers shall not be required. Hand and face washing facilities shall be required. Submit methods of removal and control as required in paragraph 1.4.D. If work is done outside, then air concentrations within the work area shall be within acceptable limits as indicated in paragraph 3.1.D. above. Submit methods of removal and control as required in paragraph 1.4.D.

## 3.2 WORK PROCEDURES

- A. Perform removal of lead containing paint in accordance with the approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62 and 40 CFR 262, except as

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specified herein. (Dispose of removed paint chips and associated waste in compliance with federal and local requirements.) The hazardous waste shall be properly drummed and labeled as required by 49 CFR 172 prior to being moved by the contractor to an accumulation point, which is within one mile of the job site (see paragraph 3.9F).

1. Personnel exiting procedures: Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:
  - a. Vacuum themselves.
  - b. Remove protective clothing in the decontamination room, and place them in an approved impermeable 6-mil polyethylene disposal bag.
  - c. Shower.
  - d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.
- B. Air monitoring: Monitor airborne concentrations of lead in accordance with 29 CFR 1926.62 and as specified below:
  1. Monitoring during lead-abatement work: Provide personnel and area monitoring and establish an 8-hour TWA during the first exposure to airborne lead to document exposure levels and determine respiratory protection requirements. Provide continuous area monitoring during each work shift inside the lead-control area, outside the entrance to the lead-control area, and at the exhaust opening of the local exhaust system. If monitoring outside the lead-control area shows airborne concentrations above 3.0  $\mu\text{g}/\text{m}^3$ , stop all work, notify the Government representative immediately, and correct the condition causing the increase. Conduct air sampling following OSHA and NIOSH guidelines, which include field calibration of sample pumps immediately before and after air sampling.
  2. Collect personal air-monitoring samples on employees who are anticipated to have the greatest risk of exposure. In addition, take air-monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
  3. Submit the results of all air samples taken in support of the contract within 10 days following their collection. Include the location of their collection (for example, area [where], personnel [who], sample number, start and stop times, dates of collection, duration of sampling, flow rate in liters per minute, sampling volume, total lead concentration in  $\mu\text{g}/\text{m}^3$ , detection limit of the analysis, TWA of the representative employee's exposure, name of the laboratory, and name of the person collecting the sample and analyzing the samples). This information shall be submitted in a formal report to the Contracting Officer. Within 24 hours of sample collection, make the sampling available for the Government representative's review. These may be laboratory reports or rough draft field data. Make field notes used at the job site during sample collection available at any time to the Government representative. Notify the Contracting Officer immediately of exposure to lead at or in excess of 3  $\mu\text{g}/\text{m}^3$  outside the lead-control area.

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4. Monitoring after final clean up: Provide area monitoring of lead concentrations and establish an air quality level of  $3 \mu\text{g}/\text{m}^3$  or less after final clean up. Before moving or removing the enclosure from the lead-abatement control area, the Government representative will conduct a visual inspection of the area to determine its cleanliness. Once the visual inspection has been passed, the Government representative will collect clearance air samples to determine lead air concentrations. If the air samples indicate levels above  $3 \mu\text{g}/\text{m}^3$ , then the contractor shall re-clean the enclosure and the visual inspection and clearance air sampling shall be repeated. This shall continue until an inspection is passed and a clearance sample is obtained. The contractor shall assist the Government representative to ensure adequate inspection of all surfaces of the enclosure and work areas. See paragraph 1.3.D.
- C. Once the visual inspection and air samples meet necessary requirements, remove the enclosure.

## 3.3 LEAD-CONTAINING PAINT REMOVAL

- A. Comply with the applicable procedure in Annex B, AEDC Safety Standard E19 and the following: Manual or power sanding/grinding of interior and exterior surfaces is not permitted unless accomplished in enclosure or done so using proper barriers, signs, HEPA vacuum attachments on equipment, and wet methods. Also see paragraph 3.1.B. and I. Remove paint within the areas as required to allow cutting or painting as identified under scope of lead abatement in section 1.1B. on the drawings and in the paint schedule in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate if painting.
  1. Mechanical paint removal and blast cleaning: Perform mechanical paint removal and blast cleaning in lead-control areas using negative-pressure full-containment with HEPA-filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with CFR and local requirements.
  2. Abrasive blasting and vacuum filtering system: The system used to collect residue paint and grit blast shall be contained in a HEPA-filtered exhausted enclosure to ensure that the emptying of residue, the maintenance of systems, and/or the replacement of filters are done in an enclosed restricted area that shall prevent the contamination of the outside work area. This enclosure area shall be constructed in accordance with the requirements for the main enclosure and will be inspected and cleared by the Government representative prior to its removal as indicated in paragraph 3.10.
- B. Do not conduct paint removal if wind speeds at the job site are greater than 20-miles per hour unless paint removal is being accomplished by chemical methods. In addition, work must stop and cleanup of all debris must occur before any precipitation begins.
- C. Do not leave debris on polyethylene or other parts of the work area overnight even if the work is not complete. Clean up all debris and contaminated polyethylene at the end of each shift.

**3.4 CLEARANCE PRIOR TO PRIMER APPLICATION**

A. Before primer application, a detailed visual inspection will be conducted by the Government representative for unprepared surfaces and visible dust. Any visible dust will be assumed to be lead contaminated. See paragraph 1.3.D. The work area including enclosure floors, walls, and ceiling shall be cleaned. If visible dust or unprepared surfaces are identified, the work area shall be re-cleaned and the inspection will be repeated. The outer enclosure shall remain intact and HEPA-filtered exhaust shall be maintained until final clearance air and inspection is conducted before enclosure removal as indicated in paragraph 3.10. Any personnel entering the work area are required to wear protective coveralls, head cover, gloves, and other necessary equipment including respirator until final clearance sampling of  $3 \mu\text{g}/\text{m}^3$  is obtained.

3.5 SAFETY: Ensure the safe passage of persons around the area of work. Comply with AEDC Safety Standard A6. Conduct operations to prevent injury to personnel and damage to existing equipment and structures.

3.6 UTILITIES: Do not interrupt existing utilities or commence power outages without written permission from the Government representative. Obtain an approved, AF Form 103, BCE Work Clearance, in accordance with AEDC Safety Standard B1, from the Government representative prior to interrupting utilities. Do not remove lead from active steam, electrical lines, or high-pressure lines. Wait for appropriate utility outages. Provide back flow prevention devices as required to prevent cross-contamination of water supplies.

3.7 COMMUNICATION DEVICES: Do not use any two-way communication devices unless pre-approved by the AEDC Security Forces.

3.8 WORK CLEARANCES: Obtain work clearances as required by AEDC Safety Standard B1. Perform hazard analysis to ensure all possible health hazards (e.g., toxic gases) have been evaluated and properly controlled. Before entering into a work space, make oxygen and Lower Explosive Limit (LEL) measurements using an NIOSH-approved  $\text{O}_2$ /LEL metering device. While persons are working, designate a stand-by person, who has been trained within the last 12 months in cardiopulmonary resuscitation (CPR) by the American Red Cross or American Heart Association, to remain outside.

**3.9 CLEAN-UP AND DISPOSAL**

A. Clean-up: Maintain surfaces of the lead-control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint-removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA-filtered vacuum cleaner. Prevent ground contaminants by enclosing the work area as specified in paragraph 3.1.B. Pre-clean the ground or floor of visible paint chips and obvious visible lead contamination prior to enclosure construction to remove visible contamination already present in the work area.

B. Visual inspections: Visually inspect the work area after pre-cleaning and before placing any polyethylene sheeting. Re-clean and inspect any area where cleaning has not been adequately done before placing polyethylene sheeting.

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Inspect enclosures for adequacy prior to removing lead. Do not start abatement procedures prior to release by a Government industrial hygienist who will visually inspect the area for cleanliness and enclosure adequacy.

- C. Inspection assistance: The designated lead-abatement supervisor shall assist in the visual inspection of all areas (enclosure areas cleaned, drums, trucks, and equipment used in lead abatement) as requested by the Government representative. This includes any inspection activity required.
- D. Testing of lead-containing paint residue and used abrasive: Where indicated or when directed by the Government representative, test lead-containing paint residue and used abrasive in accordance with 40 CFR 261 and AEDC Safety Standard E18.
- E. Non-hazardous debris disposal: Transport debris, rubbish, demolition waste, and other non-hazardous materials resulting from work from the site to the construction landfill which is located approximately 2 miles west of the intersection of Avenue E and 6th Street. Do not place edibles or garbage in the construction landfill; use existing dumpster boxes. Dispose of all material contaminated by lead as hazardous waste in compliance with AEDC Safety Standard E18.
- F. Hazardous waste disposal:
  - 1. Where hazardous waste (as identified or listed by 40 CFR 261) is generated, follow the procedures given in AEDC Safety Standard E18 for storing and turning in hazardous waste. These procedures include the requirement for completion of Forms GC-565 and GC-1337, which will be furnished by the Government representative. Return the completed forms to the Government representative prior to transporting the drums to the accumulation point.
  - 2. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and clothing, which may produce airborne concentrations of lead particles.
  - 3. Store removed paint, lead-contaminated clothing and equipment, and lead-contaminated dust and cleaning debris into U. S. Department of Transportation 49 CFR 178-approved 55-gallon drums, which the contractor shall provide. Test the contents to determine the hazardous characteristics, and submit the test results to the Government representative as described in subparagraph 1 above. The contractor shall label and move the waste to a designated accumulation point in accordance with 40 CFR 262 and 49 CFR 172. The Government will be responsible for the further transportation and disposal of the waste.
  - 4. Do not place any hazardous waste, as defined in 40 CFR 261, in any AEDC landfill.

### 3.10 LEAD ABATEMENT COMPLETION

- A. Samples and tests: Do not remove protective barricades or enclosures until concurrence is received in writing from the Government representative. The Government representative will visually inspect the surfaces of both the enclosure and abated substrate for visible dust contamination, and the contractor shall re-clean all areas as required. Also see paragraph 1.3.D. Wipe and/or microvac samples will be collected to determine that the lead surface contamination does not exceed 500- $\mu\text{g}/\text{ft}^2$  of surface. If any wipe and/or



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- microvac samples do not meet this criterion, re-clean the entire work area. If re-cleaning is required, monitor airborne lead concentrations during and after re-cleaning. Once the visual inspection has been made and wipe and/or microvac samples indicate clean surface levels, clearance air monitoring will be accomplished. If airborne lead concentrations exceed  $3 \mu\text{g}/\text{m}^3$ , re-clean the area. Clearance monitoring will be repeated by the Government representative as necessary. HEPA-filtered air systems shall be operated continually until adequate clearance levels are met. In addition to air and wipe samples, soil, gravel, and water samples will be taken in the work area to determine that lead contamination in the area is no greater than 3.7 parts per million above pre-construction levels in soil and gravel or 100 parts per billion in water regardless of the pre-construction levels. Sample results below these limits are required before enclosures or barricades are removed. Shower water shall be sampled prior to disposal to ensure that the 100-parts-per-billion level is met. See paragraph 3.1.B.4. Analysis of air and wipe samples collected and tested by the Government representative may take 1-1/2 to 3 work days, with bulk and water analysis taking up to 5 work days. Keep the area sealed, barriers intact, and HEPA-filtered air exhaust ventilation in operation until the results of final air samples are received.
- B. Work area inspection: The Government representative will visually inspect the general work area following enclosure removal to ensure the work area has been adequately cleaned and to ensure that no damage has been done to buildings, structures, or equipment.

## **ATTACHMENT 2: PERFORMANCE INFORMATION**

Provide the information requested in this form for each program being described. Provide frank, concise comments regarding your performance on the contracts you identify. If more space is required, continue on the back of form or on one continuation sheet.

A. Offeror Name (Company/Division):

B. Program Title:

C. Contract Specifics:

1. Contract Number \_\_\_\_\_

2. Contract Type \_\_\_\_\_

3. Period of Performance \_\_\_\_\_

4. Original Contract \$ Value \_\_\_\_\_

5. Current Contract \$ Value \_\_\_\_\_

6. If Amounts for 4 and 5 above are different, provide a brief description of the reason:

7. Motor Horsepower: \_\_\_\_\_

8. Type of Motor: \_\_\_\_\_

9. Type of Starting System: \_\_\_\_\_

10. Number of elements in drivetrain: \_\_\_\_\_

D. Completion Date:

1. Original date: \_\_\_\_\_

2. Current Schedule: \_\_\_\_\_

3. Estimate at Completion: \_\_\_\_\_

4. How Many Times Changed: \_\_\_\_\_

5. Primary Causes of Change: \_\_\_\_\_

E. Primary Customer Points of Contact:

(Please provide current information on both individuals)

	<b>Program Manager:</b>	<b>Contracting Officer:</b>
Name:	_____	_____
Office	_____	_____
Address	_____	_____
Telephone	_____	_____

F. Subcontracting Goals

**Identify If A Small Business Or Disadvantaged Business Subcontracting Plan Or Goal Was Required. If So, Identify In Terms Of A Percentage The Planned Versus Achieved Goal During The Contract. If Goals Were Not Met, Please Explain.**

G. Brief Description of Effort as \_\_Prime or \_\_Subcontractor

Highlight portions considered most relevant to current acquisition, including similar problems/risks that were encountered.

#### H. Brief Description of Project Organization

Identify whether effort was performed with in-house resources, subcontractors, teaming arrangement or other multi-company organization and identify any major subcontractors/teaming partners. Describe your role in the integration of the design/fabrication/installation effort.